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**Did Mandatory Unbundling Achieve Its Purpose?
Empirical Evidence from Five Countries**

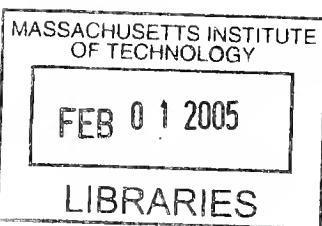
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Working Paper 04-40

Nov 1, 2004

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Cambridge, MA 02142

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Did Mandatory Unbundling Achieve Its Purpose? Empirical Evidence from Five Countries

Jerry A. Hausman†
 J. Gregory Sidak††

In this article, we examine the rationales offered by telecommunications regulators worldwide for pursuing mandatory unbundling. We begin by defining mandatory unbundling, with brief descriptions of different wholesale forms and different retail products. Next, we examine four major rationales for regulatory intervention of this kind: (1) competition in the form of lower prices and greater innovation in retail markets is desirable, (2) competition in retail markets cannot be achieved with mandatory unbundling, (3) mandatory unbundling enables future facilities-based investment ('stepping-stone' or 'ladder of investment' hypothesis), and (4) competition in wholesale access markets is desirable. We proceed by testing empirically the major rationales in the United States, the United Kingdom, New Zealand, Canada, and Germany. For each case study, we review the mandatory unbundling experience with respect to retail pricing, investment, entry barriers, and wholesale competition. We review the lessons learned from the unbundling experience. We also identify which rationales were incorrect in theory and which rationales were correct in theory yet were not satisfied in practice. For the second category of rationales, we attempt to provide alternative explanations for the failure of mandatory unbundling to achieve its goals.

I. What Is Mandatory Unbundling?	3
A. Different Wholesale Forms	4
1. Mandatory Unbundling at Different Levels of the Network	4
2. Mandatory Unbundling Versus Service Resale	5
a. Mandatory Unbundling Versus Resale of Voice Services	6
b. Line Sharing Versus Bitstream Access of Data Services	6
B. Different Resulting Retail Products	8
1. Voice Services	8
a. Mass Market Versus Enterprise	8
b. Rural Versus Urban	10
2. Data Services	10
3. Existing Services Versus New Services	11
II. Why Pursue Mandatory Unbundling?	11
A. Rationale 1: Competition in Retail Markets Is Desirable	11
1. Innovation and Investment	12
2. Prices and Retail Margins	13
B. Rationale 2: Competition in Retail Markets Cannot Be Achieved Without Mandatory Unbundling	14

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1. A Vertically Integrated Firm Generally Prefers Its Own Downstream Affiliate	14
2. Entry Barriers Prevent Natural Competition	15
C. Rationale 3: Mandatory Unbundling Enables Future Facilities-Based Investment	16
D. Rationale 4: Competition in Wholesale Access Markets Is Desirable	18
1. A Network of Networks	18
2. Regulatory Withdrawal	19
E. Conclusion	19
III. The Unbundling Experience in Five Countries	20
A. United States	21
1. Retail Competition	21
a. Pricing	21
b. Investment	22
2. Entry Barriers	24
3. Stepping-Stone Hypothesis	28
4. Wholesale Competition	32
5. Other Observations about the Process	33
B. United Kingdom	33
1. Retail Competition	36
a. Pricing	36
b. Investment	37
2. Entry Barriers	38
3. Stepping Stone Hypothesis	40
4. Wholesale Competition	40
5. Other Observations About the Process	42
C. New Zealand	44
1. Retail Competition	46
a. Pricing	46
b. Investment	47
2. Entry Barriers	48
3. Stepping Stone Hypothesis	50
4. Wholesale Competition	50
5. Other Observations about the Process	50
D. Canada	51
1. Retail Competition	53
a. Pricing	53
b. Investment	55
2. Entry Barriers	56
3. Stepping Stone Hypothesis	58
4. Wholesale Competition	59
5. Other Observations about the Process	60
E. Germany	61
1. Retail Competition	62
a. Pricing	62
b. Investment	62
2. Entry Barriers	63
3. Stepping Stone Hypothesis	65
4. Wholesale Competition	65
5. Other Observations About the Process	66

F. Summary.....	66
IV. Lessons Learned from the Unbundling Experience	68
A. The Rationales That Were Not Correct in Theory	68
B. The Rationales That Were Correct in Theory Yet Were Not Satisfied in Practice	69
Conclusion	70

I. What Is Mandatory Unbundling?

In the 1990s, mandatory unbundling became the proposed remedy of choice in regulatory and antitrust proceedings. For a decade or more, the dominant theme in regulatory and antitrust law has been what might be called 'the spirit of sharing.' For example, in the United States, the Telecommunications Act of 1996 rests on the hypothesis that requiring a firm to share the use of its facilities with its competitors will enable the competitors eventually to build their own facilities, presumably to the eventual benefit of consumers. The mandatory sharing of facilities is thus the segue to eventual competition between rival infrastructures or platforms. The corollary of this assumption is that, but for this exact form of regulatory intervention, natural market forces cannot be counted on to produce facilities-based competition.¹

Any firm may choose to unbundle or lease components of its network with a third party *at a voluntarily negotiated rate*. The firm is also able to decide the scope of unbundling it wants to undertake—how much of its network to resell. The term 'mandatory unbundling' describes an involuntary exchange between an incumbent network operator and a rival *at a regulated rate* where the scope of unbundling is determined by regulators. Determination of the access rate thus becomes the major bone of contention between incumbent and entrant, as a regulatory access rate that is equal to the voluntarily agreed-upon access rate cannot really be said to constitute 'mandatory' unbundling. When formulating that access rate, regulators have generally opted in favor of a measure of total element long-run incremental cost (TELRIC) or total service long-run incremental cost (TSLRIC) and against a measure of opportunity cost or option value.²

1. The nearest example in the antitrust literature was an abandoned remedy in *Microsoft* that would have forced the incumbent operating system provider to disclose its source code to rivals. See J. Gregory Sidak, 'An Antitrust Rule for Software Integration', 18 Yale J. on Reg. 1 (2001).

2. For a detailed analysis of the scope of the unbundling decision and the access pricing decision by a telecommunications regulator, see Jerry A. Hausman/J. Gregory Sidak, 'A Consumer-Welfare Approach to Mandatory Unbundling of Telecommunications Networks', 109 Yale L. J. 417 (1999). For a review of unbundling in other contexts, see J. Gregory Sidak/Hal J. Singer, 'Interim Pricing of Local Loop Unbundling in Ireland: Epilogue', 4 J. Network Indus. 119 (2003); J. Gregory Sidak/Allan T. Ingraham, 'Mandatory Unbundling, UNE-P, and the Cost of Equity: Does TELRIC Pricing Increase Risk for Incumbent Local Exchange Carriers?', 20 Yale J. Reg. 389 (2003); J. Gregory Sidak/Hal J. Singer, 'How Can Regulators Set Nonarbitrary Interim Rates? The Case of Local Loop Unbundling in Ireland', 3 J. Network Indus. 273 (2002); Thomas M. Jorde/J. Gregory Sidak/David J. Teece, 'Innovation, Investment, and Unbundling', 17 Yale J. Reg. 1 (2000). J. Gregory Sidak/Daniel F. Spulber, 'The Tragedy of the Telecommons: Government Pricing of Unbundled Network Elements Under the Telecommunications Act of 1996', 97 Colum. L. Rev. 1081 (1997).

In this section, we define common terms used in mandatory unbundling proceedings and identify relevant product markets that are affected by unbundling policy. We also analyze different wholesale forms of mandatory unbundling and the resulting retail products, with a special emphasis on new versus existing products. Although we rely extensively on the U.S. experience to introduce the basic concepts of mandatory unbundling, Part III of this report examines the unbundling experience of several other countries.

A. Different Wholesale Forms

Regulators mandate unbundling at various parts of an incumbent local exchange carrier's (ILEC) network, including the loop, transport, and switch. When selecting which elements to make available to competitors at regulated rates, regulators have considered the effect of mandatory unbundling in conjunction with the potential for resale of final services.

I. Mandatory Unbundling at Different Levels of the Network

Mandatory unbundling at a regulated rate may apply to various 'network elements,' which are defined by the U.S. Telecommunications Act of 1996 as 'a facility or equipment used in the provision of a telecommunications service.'³ The Act instructs the FCC to consider whether 'the failure to provide access to such network elements would impair the ability of the telecommunications carrier seeking access to provide the services that it seeks to offer.'⁴ Under the Act, prices for unbundled network elements (UNEs) are based on the cost of providing the interconnection or network element.⁵ The Federal Communications Commission (FCC) interpreted that pricing rule as 'forward-looking, long-run, incremental cost.'⁶ In practice, prices are 'based on the TSLRIC [total service long run incremental cost] of the network element . . . and will include a reasonable allocation of forward-looking joint and common costs.'⁷

As part of its *Triennial Review Order* of its unbundling regulations, the FCC explained that ILECs were required to provide access to network elements 'to the extent that those elements are capable of being used by the requesting carrier in the provision of a telecommunications service.'⁸ The FCC ordered all ILECs to make available at regulated rates the following UNEs:

3. 47 U.S.C. § 153(29).

4. 47 U.S.C. § 251(d)(2)(B).

5. 47 U.S.C. § 252(d)(1) (stating that 'Determinations by a State commission of the just and reasonable rate for the interconnection of facilities and equipment for purposes of subsection (c)(2) of section 251, and the just and reasonable rate for network elements for purposes of subsection (c)(3) of such section—'(A) shall be—'(i) based on the cost (determined without reference to a rate-of-return or other rate-based proceeding) of providing the interconnection or network element (whichever is applicable), and '(ii) nondiscriminatory, and '(B) may include a reasonable profit.').

6. *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996; Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers*, CC Docket Nos. 96-98, 95-185, First Report and Order, 11 F.C.C. Rcd. 15499, ¶ 620 (1996) [hereinafter *First Report & Order*].

7. *Ibid.* at ¶ 672

8. Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, CC Dkt. No. 01-338, 20 August 2003, at 42 ¶ 59 [hereinafter *Triennial Review*], rev'd, U.S. Telecom Ass'n v. FCC, 290 F.3d 415, 428-29 (D.C. Cir. 2002) [hereinafter *USTA*].

- (1) stand-alone copper loops and subloops for the provision of narrowband and broadband services,
- (2) fiber loops for narrowband service in fiber loop overbuild situations where the incumbent LEC elects to retire existing copper loops,
- (3) subloops necessary to access wiring at or near a multiunit customer premises,
- (4) network interface devices (NID), which are defined as any means of interconnecting the ILEC's loop distribution plant to wiring at a customer premises location,
- (5) dark fiber, DS3, and DS1 transport, subject to a route-specific review by the states to identify available wholesale facilities,
- (6) local circuit switching serving the mass market,
- (7) shared transport only to the extent that carriers are impaired without access to unbundled switching,
- (8) signaling network when a carrier is purchasing unbundled switching, and
- (9) call-related databases when a requesting carrier purchases unbundled access to the incumbent LEC's switching,
- (10) operations support systems (OSS) for qualifying services, which consists of pre-ordering, ordering, provisioning, maintenance and repair, and billing functions supported by an ILEC's databases and information, and
- (11) combinations of UNEs, including the loop-transport combination (enhanced extended link, or EEL).⁹

Based on this exhaustive list, it is reasonable to conclude that, at least in the United States, virtually no component of an incumbent's network was immune from unbundling obligations eight years after the passage of the Telecommunications Act.

2. Mandatory Unbundling Versus Service Resale

To introduce competition in the final service market, regulators have made network elements available for lease, or have made final services available for resale, or both. In this section, we review the choices of the regulator in the United States and New Zealand with respect to that decision.

9. Ibid, at 10-13

a. Mandatory Unbundling Versus Resale of Voice Services

The Telecommunications Act allows for local service competition through three types of entry: resale, leasing of UNEs, and investment in and ownership of full facilities.¹⁰ Resale requires the least initial capital investment, but it limits the entrant to reselling the ILEC's products in their original form. Leasing some parts of the network as UNEs provides an entrant greater flexibility to develop services than does resale. With regard to the resale of telecommunication services, the Act clearly states that prices are to be based on the retail price less any associated marketing, billing, collection, or other costs forgone by the ILEC.¹¹ Accordingly, the resale pricing standard set forth by the FCC requires state commissions to: '(1) identify what marketing, billing, collection, and other costs will be avoided by incumbent LECs when they provide services at wholesale; and (2) calculate the portion of the retail prices for those services that is attributable to the avoided costs.'¹² In practice, resale prices are determined either through avoided cost studies or by default discount rates set forth by the FCC.¹³ The FCC believed that this form of pricing would induce competition in the telecommunications market and increase efficiency in the arbitration and negotiation processes.

In its *Triennial Review Order* in 2003, the FCC commented that competitive local exchange carriers' (CLECs) purchase of total service resale for voice service had declined from a peak of almost 5.4 million lines in 2000 to below 3.5 million lines by mid-2002.¹⁴ By contrast, the number of UNEs, which includes loops acquired separately and in conjunction with switching (the 'unbundled platform' or UNE-P), increased from 1.5 million to 11.5 million over the same period.¹⁵ Many scholars in the United States attribute the massive substitution from resale toward UNEs to the mispricing of UNEs.¹⁶

b. Line Sharing Versus Bitstream Access of Data Services

Bitstream access provides service-level (resale) entry to digital subscriber line (DSL) data provision. Under the bitstream approach, the entrant buys the complete service for a high-speed link to the consumer, and the service includes delivery to the first data switch in the incumbent's network. Line sharing, by contrast, allows the entrant to acquire the high-frequency portion of the copper connection but requires it to make some investments in infrastructure.

Mandatory line sharing was attempted and then abandoned in the United States. In the FCC's *Line Sharing Order* released in 1999, the FCC directed ILECs to provide the high-frequency portion of the local loop (HFPL) to requesting

10. 47 U.S.C. § 251.

11. 47 U.S.C. § 252(d)(3) (stating that 'a State commission shall determine wholesale rates on the basis of retail rates charged to subscribers for the telecommunications service requested, excluding the portion thereof attributable to any marketing, billing, collection, and other costs that will be avoided by the local exchange carrier.').

12. See First Report & Order, above n 6, at ¶ 908.

13. Ibid

14. See Triennial Review, above n 8, at 32 ¶ 41.

15. Ibid

16. See, e.g., Robert W. Crandall/Allan T. Ingraham/Hal J. Singer, 'Do Unbundling Policies Discourage CLEC Facilities-Based Investment?', 4 Topics in Economic Analysis & Policy ____ (forthcoming 2004).

carriers as a UNE.¹⁷ The Commission found in the *Line Sharing Order* that '[t]he record shows that lack of access would materially raise the cost for competitive LECs to provide advanced services [such as DSL] to residential and small business users, delay broad facilities-based market entry and materially limit the scope and quality of competitor service offerings.'¹⁸ In May 2002, however, the U.S. Court of Appeals for the D.C. Circuit vacated the *Line Sharing Order*, finding that the Commission had failed to give adequate consideration to existing facilities-based competition in the provision of broadband services, especially by cable systems.¹⁹ In its August 2003 *Triennial Review Order*, the FCC decided not to reinstate the vacated line-sharing rules because it determined that 'continued unbundled access to stand-alone copper loops and subloops enables a requesting carrier to offer and recover its costs from all of the services that the loop supports, including broadband service.'²⁰

The FCC rejected its prior finding that lack of separate access to the high frequency portion would cause impairment for four reasons. First, the FCC explained that its earlier impairment finding had been based on a notion that broadband revenues would not justify the cost of the whole loop. After considering revenues from voice and video, the FCC determined that such revenues would offset the costs associated with purchasing the entire loop.²¹ Second, the FCC explained that CLECs interested only in broadband could obtain broadband frequencies from other CLECs through line-splitting, in which one CLEC provides voice service on the low frequency portion of the loop and the other provides DSL on the high frequency portion.²² Third, the FCC noted that the difficulties of cost allocation for different portions of a single loop had led most states to price the high frequency portion of the loop at approximately zero, which distorted competitive incentives.²³ Fourth, the FCC recognized the substantial intermodal competition from cable companies, which lessened any competitive benefits associated with line sharing.²⁴

In its March 2004 opinion, the D.C. Circuit Court of Appeals upheld the FCC's decision to eliminate line sharing, concluding that the FCC 'reasonably found that other considerations outweighed any impairment.'²⁵ With respect to the incentive problem raised by the FCC, the court opined: '[I]t is of course true that alternative cost allocations could have reduced the skew, but any alternative allocation of costs would itself have had some inescapable degree of

17. Deployment of Wireline Services Offering Advanced Telecommunications Capability and Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, CC Dkt. Nos. 98-147, 96-98, Third Report and Order in CC Dkt. No. 98-147 and Fourth Report and Order in CC Dkt. No. 96-98, 15 F.C.C. Rcd. 3,696 (1999) [hereinafter *Third Order*].

18. *Ibid.* at 20,916 ¶ 5

19. *U.S. Telecom Ass'n v. FCC*, 290 F.3d 415, 428-29 (D.C. Cir. 2003).

20. See *Triennial Review*, above n 8, at 125 at ¶ 199.

21. *Ibid.* at ¶ 258

22. *Ibid.* at ¶ 259

23. *Ibid.* at ¶ 260

24. *Ibid.* at ¶ 263. Interestingly, the chairman of the FCC, Michael K. Powell, did not agree with the decision to terminate line sharing, arguing that 'the continued availability of line sharing and the competition that flowed from it likely would have pressured incumbents to deploy more advanced networks in order to move from the negative regulatory pole to the positive regulatory pole, by deploying more fiber infrastructure.' Separate Statement of Chairman Michael K. Powell, Dissenting in Part, 20 February 2003, at 1 (available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-231344A3.doc).

25. *United States Telecom Ass'n v. FCC*, 359 F.3d 554, 585 (D.C. Cir. 2004).

arbitrariness.²⁶ The court added that ‘intermodal competition from cable ensures the persistence of substantial competition in broadband.’²⁷

Regulators in other nations have chosen bitstream access over line sharing. For example, in December 2003, the New Zealand Commerce Commission recommended the designation of an ‘asymmetric DSL bitstream access service’.²⁸ The agency defined ADSL bitstream access service as ‘a high speed IP access service which provides good performance, but could not typically support extensive use of mission critical applications which require excellent real-time network performance or availability.’²⁹ The Commission defined bitstream access as a situation in which the incumbent’s access link ‘is made available to other operators, which are then able to provide high-speed services to end-consumers.’³⁰ The agency concluded the net social benefits from bitstream access exceeded the net social benefits of line sharing due to the lower total cost of providing the unbundled service (collocation costs are avoided in bitstream access).³¹ The Commission reasoned that, under bitstream access, entrants face a lower risk of investing in network components such as DSLAMs that might not be fully utilized.³² We discuss the New Zealand experience in greater detail in a later section.

B. Different Resulting Retail Products

As we describe in Part II, one objective of mandatory unbundling is to increase competition in certain final services markets. Below, we describe the relevant product markets that are affected by mandatory unbundling.

1. Voice Services

The voice services market is typically divided into two markets: the mass market for consumers and the enterprise market for businesses.

a. Mass Market Versus Enterprise

Unbundling rates and the relative size of those rates with respect to the actual costs of facilities-based entry influence a CLEC’s entry strategy across mass markets and enterprise markets. Using the United States as an example, CLECs began competing with ILECs in the enterprise market for voice services in the mid-1980s. Competitive access providers (CAPs) began providing competitive exchange access service to larger business customers in New York in the 1980s.³³ CLECs self-provision facilities, lease facilities from other competitive facilities

26. Ibid, at 46

27. Ibid

28. New Zealand Commerce Commission, Section 64 Review and Schedule 3 Investigation into Unbundling the Local Loop Network and the Fixed Public Data Network, Final Report, December 2003 (available at <http://www.comcom.govt.nz/telecommunications/llu/finalreport.PDF>).

29. Ibid, at Appendix 5

30. Ibid, at 117

31. Ibid, at 20

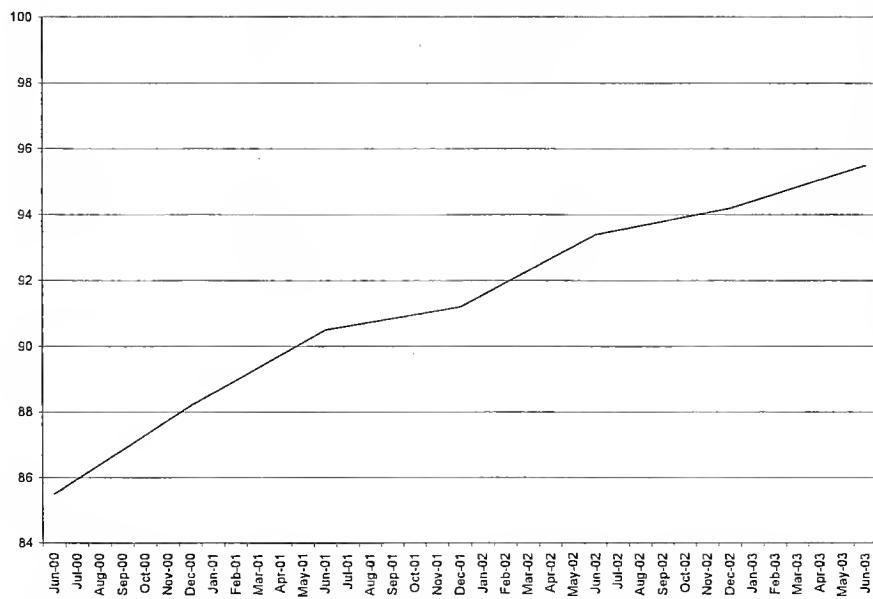
32. Ibid, at 21

33. See Triennial Review, above n 8, at 34 ¶ 44. For a review of CAPs, see Daniel F. Spulber/J. Gregory Sidak, *Deregulatory Takings and the Regulatory Contract: The Competitive Transformation of Network Industries in the United States*, (Cambridge: Cambridge University Press 1997) 80-82.

providers, or purchase high-capacity (DS1 and above) loops either as UNEs or special-access services from the ILECs.³⁴ As of August 2003, CLECs reported about 51 percent of their customer access lines served medium and large business customers.³⁵ According to the estimate of one regional Bell operating company (RBOC), the CLECs' share of special-access revenues was at least 28 percent in 2002.³⁶

In contrast to the enterprise market, the mass market for voice services was not served extensively by CLECs before 1996. Since the passage of the Telecommunications Act in 1996, however, several CLECs began to provide competitive voice service to many residential customers in the United States. According to the FCC, by June 2003, the latest date on which the FCC reports such data, 95.5 percent of the U.S. population lived in a zip (postal) code served by at least one CLEC providing some kind of service.³⁷ Figure 1 shows the consistent increase in the percentage of households in zip codes served by at least one CLEC (including cable telephony providers) from 2000 to 2003.

Figure 1: Percentage of U.S. Households in Zip Codes with at Least One CLEC



Source: FCC Local Competition Bureau, Local Telephone Competition December 2003 Report, at Table 15 (available at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/lcom1203.pdf)

34. See Triennial Review, above n 8, at 34 ¶ 44.

35. FCC, Local Telephone Competition: Status as of 31 December 2002, at tbl. 2 (rel. 12 June 2003) (available at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/lcom0603.pdf) [hereinafter *FCC Local Competition Report 2002*].

36. BOC UNE Fact Report 2002, App. L, at L-1, L-2.

37. FCC, Local Telephone Competition: Status as of 30 June 2003, at tbl. 15 (rel. 22 December 2003) (available at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/lcom1203.pdf) [hereinafter *FCC Local Competition Report 2003*].

As of June 2003, the CLECs had nearly 27 million access lines, or 14.7 percent of total U.S. access lines.³⁸ Sixty two percent of CLEC lines serve the mass market for voice services, whereas more than 78 percent of BOC lines serve this group.³⁹ UNE-based CLEC expansion is expected to slow in the United States, as evidenced by AT&T and MCI's announcements that they are withdrawing from the residential market, citing an adverse D.C. Circuit decision.⁴⁰

b. Rural Versus Urban

Universal service obligations in the United States created a complex system of cross-subsidies, in which consumers in urban areas subsidized the service of consumers in rural areas.⁴¹ The degree to which low rates in rural areas are supported by high rates in urban areas should, in theory, have a negative effect on UNE-based competition in rural areas. Because CLECs prefer higher margins to lower margins, and because the CLEC margin is equal to the difference between the retail rate and the access rate, UNE-based CLECs have tended to avoid rural areas. Indeed, CLECs are more often found in urban than rural areas. Close to 26 percent of all zip codes, serving only 4.5 percent of the U.S. population, have no CLEC presence according to FCC data.⁴² Another factor that might prevent CLEC entry in rural areas is that many rural LECs are exempt from the unbundling requirements of the Telecommunications Act.⁴³

2. Data Services

In the United States, demand for Internet access has spurred greater demand for DSL service. Line sharing, which we described above, was not available for U.S. CLECs until 2000. By contrast, CLECs could lease an entire copper line for data services as early as 1998. As of June 2003, about 7.7 million DSL lines were in service.⁴⁴ Of those lines, ILECs were the major providers of DSL service with 94.6 percent of DSL lines, while CLECs accounted for 5.4 percent.⁴⁵ With the elimination of line sharing in the United States, the CLECs' share of DSL lines is not expected to increase at the same rate.

It bears emphasis that DSL service does not constitute its own product market, as cable modem service is considered an extremely close substitute for DSL service for a majority of broadband users.⁴⁶ As of December 2003, U.S. cable companies offered cable modem service capability to 88.2 percent of U.S. households with a penetration rate of 16.8 percent.⁴⁷ In 2003, cable companies

38. Ibid, at Table 1

39. Ibid, at Table 2

40. See, e.g., Bruce Meyerson, *Detroit Free Press*, 8 October 2004, *1

41. See, e.g., Robert W. Crandall/Leonard Waverman, *Who Pays for Universal Service?: When Telephone Subsidies Become Transparent*, (Washington, DC: Brookings Institution 2000) 9-11. [hereinafter *Who Pays for Universal Service*]

42. See FCC Local Competition Report 2003, above n 37, at tbls. 14, 15.

43. 47 U.S.C. § 251(f)(1), (2).

44. See FCC Local Competition Report 2003, above n 37, at tbl. 5.

45. Ibid

46. See, e.g., Jerry A. Hausman/J. Gregory Sidak/Hal J. Singer, 'Cable Modems and DSL: Broadband Internet Access for Residential Customers', 91 Am. Econ. Ass'n Papers & Proceedings 302 (2001).

47. National Cable Television Association, Statistics & Resources (available at <http://www.ncta.com/Docs/PageContent.cfm?pageID=86>).

provided cable modem service to approximately 13.7 million subscribers,⁴⁸ which was nearly double the number of DSL subscribers.

3. Existing Services Versus New Services

From an entrant's perspective, leasing some parts of the network provides greater flexibility to develop existing services than does resale, but it may result in less flexibility to add new services than does full facilities ownership. The unbundling decision cannot be made, however, without consideration of how it affects an incumbent's incentive to invest in new services. In 2003, the FCC decided to remove all unbundling obligations for broadband platforms enabled by the deployment of fiber-to-the-home (FTTH) loops.⁴⁹ These platforms are expected to create a variety of new services, which will compete directly with cable broadband offerings and the broadband offerings provided by satellite and wireless carriers. The FCC reasoned that the threat of mandatory unbundling for a new service that required a large sunk investment would undermine the ILECs' incentive to deploy fiber networks.⁵⁰

II. Why Pursue Mandatory Unbundling?

In this section, we examine the theoretical underpinnings of mandatory unbundling. We also survey the rationales offered by regulatory agencies in support of mandatory unbundling. In general, mandatory unbundling was believed to, among other items, (1) generate competition in retail markets through greater innovation and investment and lower prices, (2) generate greater competition in wholesale markets, and (3) encourage entrants to migrate from unbundling to facilities-based approach. Because our focus is on the benefits of mandatory unbundling, we do not consider its regulatory costs, such as the difficulties in implementation or compliance costs for operators. When considering unbundling, a regulator also should take account of a full range of efficiency considerations, including allocative (consumer welfare gains associated with greater penetration at lower prices), productive efficiency (producer surplus associated with reductions in marginal costs), and dynamic efficiency (how welfare is generated and distributed over time).

A. Rationale 1: Competition in Retail Markets Is Desirable

In a static model that does not consider investment in future periods, consumers benefit from mandatory unbundling to the extent that such regulation lowers retail prices. In a dynamic model, mandatory unbundling at regulated rates runs the risk of decreasing investment by both ILECs (by truncating returns by granting a 'free

48. FCC, High-Speed Services for Internet Access: Status as of 30 June 2003, at tbl. 5 (rel. 22 December 2003) (available at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1203.pdf) [hereinafter *FCC High-Speed Services*]

49. See Triennial Review, above n 8, at 10.

50. Ibid at 125 ¶ 200 ('As explained more fully below, this unbundling approach—*i.e.*, greater unbundling for legacy copper facilities and more limited unbundling for next-generation network facilities—appropriately balances our goals of promoting facilities-based investment and innovation against our goal of stimulating competition in the market for local telecommunications services.').

option' to CLECs)⁵¹ and CLECs (by increasing the relative return of UNE-based entry). Despite these factors, proponents argued that the net effect of mandatory unbundling was to increase investment by both ILECs and CLECs.

1. Innovation and Investment

According to its proponents, mandatory unbundling at regulated rates encourages innovation and investment on behalf of both incumbents and entrants. In its *Third Order* implementing the Telecommunications Act, the FCC explained that a positive by-product of mandatory unbundling at TELRIC was greater innovation on behalf of entrants and incumbents:

Unbundling rules that encourage competitors to deploy their own facilities in the long run will provide incentives for both incumbents and competitors to invest and innovate, and will allow the Commission and the states to reduce regulation once effective facilities-based competition develops.⁵²

The more competitors in the market, the FCC reasoned, the greater the incentive to introduce a new technology to gain a technological edge. With the correct incentives in place, the need for wholesale regulation would disappear:

The unbundling standards we adopt in this Order . . . seeks [sic] to create incentives for both incumbents and requesting carriers to invest and innovate in new technologies by establishing a mechanism by which regulatory obligations to provide access to network elements will be reduced as alternatives to the incumbent LECs' network elements become available in the future.⁵³

With greater facilities-based investment, the FCC reasoned, the market could one day be relied upon to discipline ILEC prices for local services.

Although it was aware of arguments that mandatory unbundling at regulated rates might discourage ILEC investment, the FCC believed that other factors in the marketplace would mitigate these negative effects:

We acknowledge that the incumbent LEC argument that unbundling may adversely affect innovation is consistent with economic theory, but events in the marketplace suggest that other factors may be driving incumbent LECs to invest in xDSL technologies, notwithstanding the economic theory.⁵⁴

For example, investment by cable companies in cable modem service was believed to be sufficient motivation for ILECs to invest in DSL facilities. Although the negative investment effects might not overcome these other factors, it is not clear how mandatory unbundling at regulated rates actually *increases* investment by ILECs. One theory is that an ILEC would have to respond to greater competition from CLECs by investing in new facilities. But to the extent that those new investments would be subject to unbundling rules, those investments might not be

51. See Jerry A. Hausman, 'Valuation and the Effect of Regulation on New Services in Telecommunications', Brookings Papers on Econ. Activity: Microeconomics (1997).

52. See *Third Order*, above n 17, at ¶ 7.

53. *Ibid* at ¶ 9 n. 12

54. *Ibid* at ¶ 315

undertaken.⁵⁵ Another theory is that the ILEC will invest in new access technologies that potentially will not be subject to unbundling rules.

2. Prices and Retail Margins

When a CLEC obtains an access line at incremental cost, it is free to charge the end user an amount anywhere between the incremental cost and the retail price. A CLEC can charge below incremental cost if it can bundle the access line with other services such as vertical services or long distance. Competition among CLECs is predicted in theory to discipline CLECs in their pricing behavior. If competition among CLECs is intense, then the retail price offered by CLECs should equal the access price for the unbundled loop plus the incremental cost of other inputs. Finally, ILECs must respond to price cuts by CLECs with their own price cuts. The equilibrium outcome of that game is lower prices.

The FCC believed that the Telecommunications Act encouraged the agency to promote retail price competition through mandatory unbundling:

[T]he 1996 Act set the stage for a new competitive paradigm in which carriers in previously segregated markets are able to compete in a dynamic and integrated telecommunications market that promises lower prices and more innovative services to consumers.⁵⁶

Even if the mandatory unbundling at TELRIC never led to facilities-based competition, the FCC reasoned, consumers would be better off to the extent that prices for local services declined:

National requirements for unbundling allow [sic] requesting carriers, including small entities, to take advantage of economies of scale in network. Requesting carriers, which may include small entities, should have access to the same technologies and economies of scale and scope available to incumbent LECs. Having such access will facilitate competition and help lower prices for all consumers, including individuals and small entities.⁵⁷

Because ILECs enjoyed a cost advantage vis-à-vis CLECs, the FCC argued, it was preferable from a social welfare perspective for retail prices to be based on the ILECs' costs and not on the CLECs' costs. Because ILECs are subject to state-sponsored price regulation, it was not clear that prices would decrease absent subsidized UNE rates. Although the FCC was concerned about stimulating retail competition for local telephone and broadband access services, most European regulators focused exclusively on stimulating retail competition in broadband markets.

55. See *AT&T Corp. v. Iowa Utilities Bd.*, 525 U.S. 366 (1999) (Breyer, J., concurring in part and dissenting in part) ('a sharing requirement may diminish the original owner's incentive to keep up or to improve the property by depriving the owner of the fruits of value-creating investment, research, or labor.').

56. See Third Order, above n 17, at ¶ 2.

57. Ibid at ¶ 507

B. Rationale 2: Competition in Retail Markets Cannot Be Achieved Without Mandatory Unbundling

Even if competition in retail markets is desirable, it is still necessary to show that competition would not occur in the absence of mandatory unbundling. In this section, we explain the reasoning articulated by unbundling proponents as to why natural market forces cannot deliver the benefits of competition in local services.

I. A Vertically Integrated Firm Generally Prefers Its Own Downstream Affiliate

In general, a vertically integrated firm prefers retail sales by its affiliated retail division to sales by an unaffiliated retailer. This preference can be reversed, however, if the access price exceeds the retail margin. Much academic work has been dedicated to analyzing the incentives of vertically integrated firms to deny access to key inputs to unaffiliated downstream rivals.⁵⁸ If a vertically integrated firm can solidify its market power in future periods by refusing to deal with rivals in a downstream market, then that firm has an anticompetitive reason for such a refusal to deal.⁵⁹ A vertically integrated firm might also refuse to deal with other unaffiliated firms in the downstream market as a means to acquire market power in that market.⁶⁰

Although no ILEC prefers unbundling its network elements *at a regulated rate* to selling its services through its own retail division, some ILECs have voluntarily unbundled their network elements to rivals at a commercially negotiated rate. For example, in January 1995, Rochester Telephone implemented its own 'Open Market Plan' for unbundling network services in New York.⁶¹ Under the Open Market Plan, Rochester restructured itself into a network services company, which retained the Rochester name, and a competitive company, Frontier Communications of Rochester, which the New York Public Service Commission regulated as a non-dominant carrier. Rochester provided on an unbundled, non-discriminatory basis the local loop, switching, and transport functions as a wholesaler, at discounted (yet voluntary) prices lower than its standard retail rates.

More recently, during a period of regulatory uncertainty due to litigation in the D.C. Circuit, several U.S. ILECs entered into voluntary agreements with CLECs for unbundled access. In April 2004, BellSouth announced that it had signed commercial agreements with Dialogica Communications, Inc., International Telnet, and CI2 for pricing of and access to BellSouth's incumbent network.⁶² In the same month, AT&T offered its own proposal for voluntary agreements.⁶³

58. See, e.g., Michael H. Riordan/Steven C. Salop, 'Evaluating Vertical Mergers: A Post-Chicago Approach', 63 *Antitrust L. J.* 513 (1995); J. Gregory Sidak/Robert W. Crandall, 'Is Structural Separation of Incumbent Local Exchange Carriers Necessary for Competition?', 19 *Yale J. Reg.* 335 (2002).

59. Dennis W. Carlton, 'A General Analysis of Exclusionary Conduct and Refusal to Deal: Why Aspen and Kodak Are Misguided', 68 *Antitrust L. J.* 669 (2001).

60. *Ibid*

61. FCC News Release, *Rochester Telephone Corporation Granted Rule Waivers to Implement its Open Market Plan*, 7 March 1995 (available at http://www.fcc.gov/Bureaus/Common_Carrier/News_Releases/1995/nrcc5030.txt).

62. *TR Daily*, 29 April 2004, *1

63. *Ibid*

AT&T suggested that the commercial rates be based on AT&T's average UNE-P per-line cost in a particular state as of March 1, 2004.⁶⁴

According to Deutsche Bank, AT&T was prepared in 2004 to settle for monthly costs \$1 to \$4 higher than its then-current rates determined under TELRIC, implying an increase from \$14 to \$15 to nearer \$17 to \$18 per line per month.⁶⁵ BellSouth's May 2004 offer to CLECs would provide that the top end for UNE-P rates would not increase by more than \$7 per month above rates then in place.⁶⁶ In April 2004, SBC offered all CLECs access to the unbundled network element platform (UNE-P) in its 13-state incumbent region for a fixed rate of \$22 per month through the end of 2004.⁶⁷ In the same month, Verizon offered all CLECs a rate of \$20 to \$24 per line per month, which exceeded its then-regulated average monthly rate by \$1.50 to \$5.50.⁶⁸

These voluntary negotiations were largely in response to the regulatory vacuum created by the D.C. Circuit vacatur of the FCC's *Triennial Review Order*, which remained in effect until June 15, 2004. In addition, federal regulators and the Bush administration have urged the RBOCs and such rivals as AT&T to negotiate access rates on their own.⁶⁹ On August 20, 2004, the FCC released a set of stop-gap rules that required the RBOCs to continue leasing their lines to CLECs at regulated rates for six months.⁷⁰ As of this writing, the FCC is drafting new rules for governing access to local phone networks, which should encourage facilities-based entry over UNE-based entry. On October 12, 2004, the Supreme Court declined to hear cases filed by AT&T Corp., MCI Inc., and an association of state utility regulators seeking to reinstate the original unbundling rules.⁷¹ If the FCC cannot meet the six-month deadline, the RBOCs would be free to increase access rates by as much as 15 percent for existing customers who purchase their service through CLECs.

2. Entry Barriers Prevent Natural Competition

In the United States, a CLEC is considered 'impaired' when lack of access to an incumbent LEC network element poses a barrier to entry that is likely to make entry into a market 'uneconomic.'⁷² In its *Triennial Review Order*, the FCC offered the following factors that contribute to entry barriers in the provision of local telephone service: (1) scale economies, (2) sunk costs, (3) first-mover advantages, (4) absolute cost advantages, (5) and barriers within the control of ILECs.⁷³ The FCC's explanation of sunk costs provides some insight as to the regulator's decision-making:

Sunk costs increase a new entrant's cost of failure. Potential new entrants may also fear that an incumbent LEC that has incurred substantial sunk costs will drop prices to protect its investment in the face of new entry. In addition, sunk

64. Ibid

65. Deutsche Bank Securities, AT&T Corporation, 30 April 2004, at 1.

66. *TR Daily*, 5 May 2004, *1

67. *TR Daily*, 20 April 2004, at *1.

68. *Comm. Daily*, 22 April 2004, *1

69. See, e.g., James S. Granelli, , *L.A. Times*, 4 May 2004, C1

70. See, e.g., Yuki Noguchi, , *Wash. Post*, 21 August 2004, E2

71. See, e.g., Hope Yen, , *Wash. Post*, 12 October 2004, *1

72. See *Triennial Review*, above n 8, at 9.

73. Ibid

costs can give significant first-mover advantages to the incumbent LEC, which has incurred these costs over many years and has already had the opportunity to recoup many of these costs through its rates.⁷⁴

According to its proponents, mandatory unbundling is necessary to overcome such barriers. The corollary of this proposition is that, without mandatory unbundling, facilities-based investment cannot occur. In its May 2002 decision vacating certain portions of the *UNE Remand Order*, the D.C. Circuit concluded that the Commission had failed to adequately explain how a uniform national rule for assessing impairment would help to achieve the goals of the Act, including the promotion of facilities-based competition. In particular, the Court stated that '[t]o rely on cost disparities that are universal as between new entrants and incumbents in *any* industry is to invoke a concept too broad, even in support of an *initial* mandate, to be reasonably linked to the purpose of the Act's unbundling provisions.'⁷⁵

Opponents of mandatory unbundling also cite the large sunk cost of the ILEC's network, but for different reasons. They argue that sunk costs imply that regulators should abstain from appropriating the quasi-rents of ILECs, which undermines the incentive of ILECs to invest in new technologies.⁷⁶ They also argue that, to the extent that network investment cannot be directed toward other uses in the event of low market demand, large sunk costs require that access prices are set higher than what would otherwise be necessary to induce investment under a standard present discounted value calculation.⁷⁷

C. Rationale 3: Mandatory Unbundling Enables Future Facilities-Based Investment

Access-based competition is supposedly the stepping stone to facilities-based competition. This proposition, or hypothesis, lies at the heart of regulatory decisions on unbundling and access pricing that the FCC and its counterparts in other nations have made since the mid 1990s. To put the matter more precisely, the question is whether regulated access-based entry is a substitute for or complement to the same firm's subsequent sunk investment in facilities. Figure 2 provides a graphical depiction of one possible rendition of the stepping-stone or 'ladder of investment' thesis.

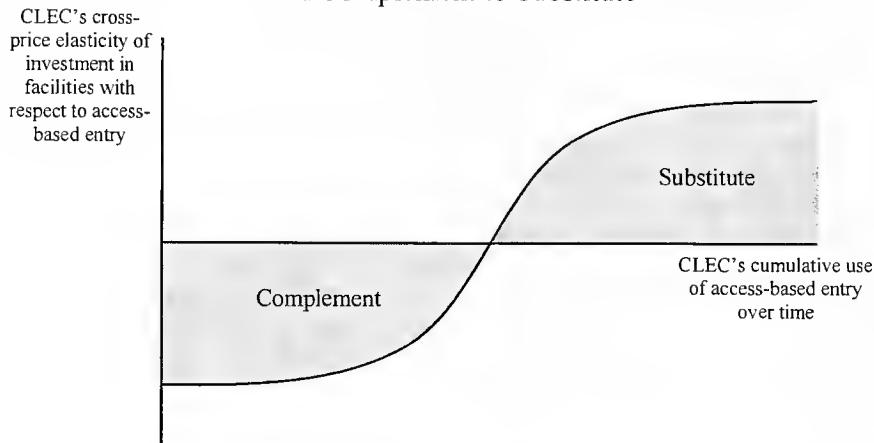
74. Ibid

75. See USTA, above n 8, at 427 (emphasis in original).

76. For a description of the role of sunk costs in access pricing and unbundling, see generally Hausman & Sidak, above n 2.

77. Ibid

Figure 2: The Metamorphosis of Access-Based Entry
from Complement to Substitute



In the telecommunications industry, the examples of the stepping-stone hypothesis are numerous. For example, MCI successfully made the transition from reseller of long-distance services to facilities-based carrier. The leasing of selected unbundled elements at regulated prices is vigorously defended by CLECs and regulators as a complement to subsequent facilities-based entry, not a substitute for it. Within the strata of regulated access-based entry options, regulators may consider UNE-P to be a stepping stone to a CLEC's subsequent investment in its own switches and its more limited reliance on unbundled local loops.⁷⁸

In implementing the unbundling rules, the FCC sought to follow the intent of Congress by creating an intermediate phase of competition, during which some new companies would deploy their own facilities to compete directly with the incumbents:

Although Congress did not express explicitly a preference for one particular competitive arrangement, it recognized implicitly that the purchase of unbundled network elements would, at least in some situations, serve as a *transitional arrangement* until fledgling competitors could develop a customer base and complete the construction of their own networks.⁷⁹

The FCC thus sought to force the incumbents to allow others to access their systems, in the hope that mandatory unbundling would create competitors who would later invest in their own facilities.

In the long run, the FCC expected that entrants would build their own facilities because doing so would enhance the entrants' ability to compete more effectively with incumbents:

78. Similarly, regulators may consider mandatory roaming at regulated prices to be a stepping stone to a wireless carrier's eventual investment in base stations and spectrum in another geographic region. However, a component of the relevant infrastructure is radio spectrum, the allocation of which is controlled by the government (at least in the primary market). Consequently, it is not clear where the stepping stone of mandated access leads in wireless.

79. See Third Order, above n 17, at ¶ 6 (emphasis added).

We fully expect that over time competitors will prefer to deploy their own facilities in markets where it is economically feasible to do so, because it is only through owning and operating their own facilities that competitors have control over the competitive and operational characteristics of their service, and have the incentive to invest and innovate in new technologies that will distinguish their services from those of the incumbent.⁸⁰

Thus, mandatory unbundling would allow entrants to derive revenue from offering services over the unbundled network elements, and then use that revenue to construct their own networks once the technology shifted. Of course, if the access rate were set too low, the transition to facilities-based competitor would not occur, as CLECs would never find it in their interests to invest in their own facilities. If access rates were set just right, this transition to facilities-based competition would generate additional social benefits, which are described in the next section.

D. Rationale 4: Competition in Wholesale Access Markets Is Desirable

Competition in the input markets was, by itself, desirable. In this section, we review how input-level competition can, in theory, generate technological innovation and incentives for gains in productive efficiency and can eventually lead to regulatory withdrawal.

1. A Network of Networks

Facilities-based entry by CLECs in the current period meant that future entrants would not have to depend exclusively on ILECs to obtain network elements. The FCC believed that mandatory unbundling would expedite this process:

Moreover, in some areas, we believe that the greatest benefits may be achieved through facilities-based competition, and that the ability of requesting carriers to use unbundled network elements, including various combinations of unbundled network elements, is a necessary precondition to the subsequent deployment of self-provisioned network facilities.⁸¹

In theory, facilities-based entry generates ‘greater benefits’ than UNE-based entry because the former signals a credible commitment to stay in the market. If an entrant has not made sunk investments in infrastructure, it cannot use sunk costs to make that signal. Nor will the incumbent face the prospect of durable capacity that survives the demise of the company that invested to create it. Moreover, facilities-based competition leads to technological diversity, which increases choice and may provide newer and better services because the CLEC does not depend on a legacy network.

The FCC envisioned that facilities-based entrants would spawn a new generation of UNE-based entrants, who in subsequent periods would become facilities-based entrants:

In order for competitive networks to develop, the incumbent LECs’ bottleneck control over interconnection must dissipate. As the market matures and the carriers providing services in competition with the incumbent LECs’ local

80. *Ibid.* at ¶ 7

81. *Ibid.* at ¶ 5

exchange offerings grow, we believe these carriers may establish direct routing arrangements with one another, forming a network of networks around the current system.⁸²

Thus, the FCC believed that mandatory unbundling at TELRIC would evolve into voluntary access arrangements. Under this scenario, some facilities-based entrants might choose to become a pure wholesaler of network elements, leaving the retail component to other CLECs.

2. Regulatory Withdrawal

Competition among facilities-based providers to supply network elements to future generations of CLECs would decrease the price of those network elements. The next generation of CLECs would, in turn, pass those savings along to end users in the form of lower retail prices. At some point in the process, the regulator could, in theory, withdraw and allow a competitive market for inputs to discipline the price of retail service.

In practice, however, regulators are reluctant to relinquish their power to control entry and allocate rents in a given market. This vision of mandatory unbundling also ignores the strategic use of regulation by competitors. Given the large rents at stake, it is not realistic to believe that the regulatory machinery could be dismantled very easily. Indeed, in the United States, the degree of regulation has increased since the passage of the Telecommunications Act of 1996.⁸³

E. Conclusion

In summary, mandatory unbundling was based on the following rationales: (1) competition in retail markets is desirable, (2) competition in retail markets cannot be achieved without mandatory unbundling, (3) mandatory unbundling promotes future facilities-based investment, and (4) competition in wholesale access markets is desirable. Fortunately, there is testable hypothesis associated with each rationale. Table 1 shows the four rationales and their associated testable hypotheses.

82. Ibid, at ¶ 7 n. 12 (quoting *Promotion of Competitive Networks in Local Telecommunications Markets*, Notice of Proposed Rulemaking and Notice of Inquiry in WT Dkt. No. 99-217 and Third Further Notice of Proposed Rulemaking in CC Dkt. No. 96-98, FCC 99-141, ¶¶ 4, 23 (rel. 7 July 1999)).

83. See, e.g., J. Gregory Sidak, 'The Failure of Good Intentions: The WorldCom Fraud and the Collapse of American Telecommunications After Deregulation', 20 Yale J. Reg. 207 (2003) (showing that the average FCC appropriations increased from \$158.8 million per year in 1981-1995 to \$211.6 million per year in 1996-2001 in real terms).

Table I: Rationales for Mandatory Unbundling and Associated Hypotheses

Rationale	Testable Hypotheses
(1) Promote retail competition	Lower retail margins, greater ILEC investment
(2) Entry barriers prevent platform competition	Entry by cable, wireless, or other providers
(3) Stepping stone to facilities-based competition	Conversion from UNE-based to facilities-based entry
(4) Wholesale competition	Competitive access networks, lower access prices

If competition among CLECs is robust (rationale 1), then CLEC margins should disappear and consumers should enjoy lower retail prices. If mandatory unbundling is truly necessary for retail competition (rationale 2), then entry barriers should prevent any firm from constructing a rival platform. If mandatory unbundling is a stepping stone to facilities-based investment (rationale 3), then we should observe individual CLECs transitioning from UNE-based to facilities-based approaches over time. Finally, if mandatory unbundling promotes wholesale competition (rationale 4), then we should observe facilities-based CLECs acting as wholesalers of network elements. In the next section, we use this analytical framework to assess the unbundling experience in five separate countries. Because mandatory unbundling is a relatively recent phenomenon in the countries surveyed, we do not examine empirically whether regulatory withdrawal has occurred.

III. The Unbundling Experience in Five Countries

The previous section considered how mandatory unbundling should work *in theory*. With the benefit of several years of experience, we turn now to an evaluation of the extent to which the rationales for mandatory unbundling were substantiated *in practice*. We focus on the unbundling experience in the United States, the United Kingdom, New Zealand, Canada, and Germany. For each country, we examine whether any of the four primary rationales for mandatory unbundling at TELRIC was substantiated in practice. We rely on data from the relevant regulatory agency that implemented the unbundling regime. For example, we discuss why regulators in New Zealand did not adopt mandatory unbundling. Each section concludes with a review of the state of facilities-based competition for local telephone service as of early 2004.

In compiling the country surveys, we observed a large variation in the degree to which economic analysis informed the regulator's decision-making process. In the United States, for example, the process was informed by legal interpretation of specific language (such as the meaning of 'impaired') or by engineering measures of hypothetical operating costs. In New Zealand, by contrast, the process was informed largely by economic analysis and by international experience with mandatory unbundling. Using economic methods, the New Zealand regulator literally assigned net welfare gains to each regulatory option and selected the path with the greatest net welfare gain. To be fair, New Zealand had the benefit of studying the experience of other nations before it decided on the optimal regulatory approach. The FCC still has not used economic analysis when modifying its rules,

despite the fact that the United States now has more than six years of unbundling experience.

A. United States

The Telecommunications Act of 1996 ordered the FCC to introduce competition into the local services market by forcing ILECs to provide entrants access to the ILECs' existing facilities at regulated rates. In 1999, the FCC explained that Congress did not provide the agency much flexibility in the exact form of managed competition: 'Congress directed the Commission to implement the provisions of section 251, and to specifically determine which network elements should be unbundled pursuant to section 251(c)(3).⁷⁸⁴ Hence, the FCC did not have the discretion to reject or embrace any of the rationales for mandatory unbundling. The only decisions left to the FCC concerned the *extent* of mandatory unbundling—namely, which elements would be included in the list of UNEs and the appropriate pricing of those elements.

1. Retail Competition

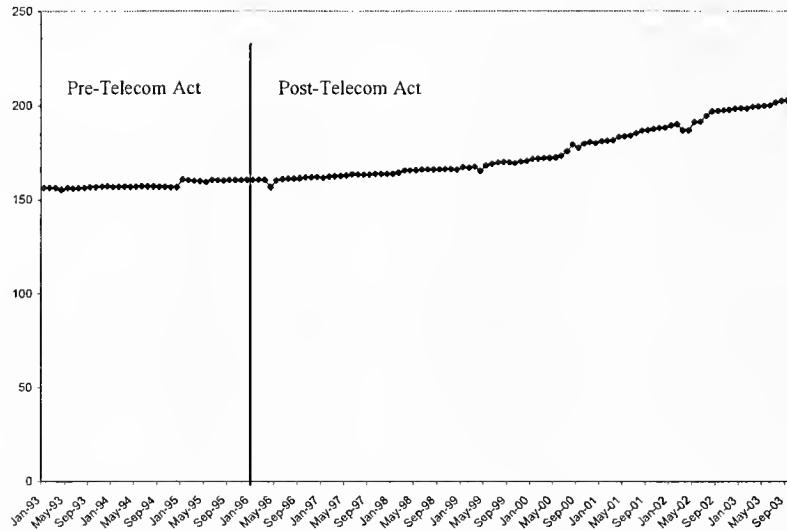
In this section, we review the unbundling experience in the United States with respect to retail pricing and investment.

a. Pricing

Retail competition triggered by mandatory unbundling should manifest itself in terms of lower retail prices. Even if price regulation of local services by state PUCs were binding, the introduction of UNE-based competition could still reduce price. In the United States, however, mandatory unbundling does not appear to have decreased local service prices measurably—despite the fact that CLECs had more than 13 percent of the nation's access lines by 2003. Figure 3 shows the Bureau of Labor Statistics' (BLS) Consumer Price Index for local telephone services from 1993 through 2003.

84. See Third Order, above n 17, at ¶ 3.

Figure 3: Consumer Price Index of Local Telephone Services
1993-2003



Source: Bureau of Labor Statistics, Consumer Price Index, All Urban Consumers, Telephone Services, Local Charges (available at <http://data.bls.gov/labjava/outside.jsp?survey=cu>).

Note: Prices normalized to 1984 dollars.

As Figure 3 shows, prices of local telephone services offered by *all carriers* in urban areas grew at a slower annual rate on average before passage of the Act (1.21 percent versus 2.96 percent).

It bears emphasis that such price comparisons do not control for other changes in the price of local service. For example, since the passage of the Telecommunications Act, the subscriber line charge (SLC) was increased and long-distance access prices were decreased. Hence, a small part of the BLS' CPI price increase might be attributable to regulatory tax shifting. According to the FCC, the average residential rate for local service provided by ILECs in urban areas *before taxes, fees, and miscellaneous charges* increased from \$13.71 in 1996 to \$14.55 in 2002.⁸⁵ Hence, mandatory unbundling does not appear to have decreased retail prices in the way the FCC intended.

b. Investment

Many scholars have examined the effect of mandatory unbundling on ILEC investment. For example, in work performed for AT&T (the largest CLEC) and submitted to the FCC, Robert D. Willig, William H. Lehr, John P. Bigelow, and Stephen B. Levinson examined the relationship between UNE-P wholesale rates and Bell companies' capital expenditures.⁸⁶ They attempted to distinguish between

85. Trends in Telephone Service, FCC Industry Analysis Division, 2003 Report, at 13-1 (rel. Aug. 2003) (available at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/trend803.pdf).

86. Robert D. Willig/William H. Lehr/John P. Bigelow/Stephen B. Levinson, *Stimulating Investment and the Telecommunications Act of 1996*. Paper filed by AT&T in FCC Docket 01-338, 11 October 2002. [hereinafter Willig *et al.*]

the 'competitive stimulus hypothesis' that UNE-P creates competition that induces increased ILEC network investment and the 'investment deterrence hypothesis' that UNE-P diminishes the return on network investment by ILECs and causes them to invest less. Willig et al. hypothesized that TELRIC-based UNE-P rates encourage entry by CLECs, which forces Bell companies to invest more in their networks to protect market share. They therefore expected to find that ILEC capital expenditures are inversely related to UNE-P prices.

Willig et al. measured the cross-sectional variation in UNE-P rates and ILEC investment behavior across 48 states. They used state investment data provided by RBOCs to the FCC in their ARMIS reports and UNE-P estimates from a variety of sources, although they relied primarily on internal AT&T data. Willig et al. calculated that, *ceteris paribus*, the growth of Bell expenditures from 1996 to 2001 varied inversely with June 2002 UNE-P rates. They calculated that the elasticity of ILEC investment to UNE-P prices was between -2.1 and -2.9, meaning that a 1 percent decrease in the UNE-P rate generated between a 2.1 and 2.9 percent increase in ILEC investment.

In a forthcoming book published by the Brookings Institution, Robert W. Crandall explained that the loss of end-user subscribers to CLECs reduces ILECs' revenues by more than their costs.⁸⁷ Crandall found that, whereas ILECs lose roughly 60 percent of the revenues associated with a given line when provisioned on an unbundled, rather than retail, basis, the avoided costs of customer service and marketing are only about 10 percent of the Bell companies' total costs.⁸⁸

Crandall also examined the relationship between the FCC's state-by-state capital expenditure data and the various measures of state UNE-P rates used by Hassett, Ivanova, and Kotlikoff;⁸⁹ Kovacs and Burns;⁹⁰ and Gregg.⁹¹ Crandall hypothesized that the UNE-P rate should not have a significant negative effect on capital expenditures because it is not logical to invest more if the ILEC receives less revenue under mandatory unbundling. In some regressions involving 1996-1999 capital expenditures, the UNE-P rate variable did have a significant, negative coefficient on ILEC investment. Yet that coefficient became insignificant for 2000-2001 capital spending when applying the UNE-P rates used by Hassett, Ivanova, and Kotlikoff, by Kovacs and Burns, and by Gregg (2001). Crandall noted that although Gregg's data for 2002 and 2003 produce increasingly significant negative coefficients for the effect of UNE-P on 1996-1999 and 2000-2001 capital spending by the Bell companies, one cannot draw conclusions from reverse application of UNE-P data. Crandall concluded that none of the studies considered provides support for the theory that UNE-P rates have influenced capital spending by Bell companies.

Crandall further demonstrated that Bell companies scaled back their capital expenditures in 2002 and 2003, and that the decline in capital expenditures was

87. Robert W. Crandall, *Competition and Chaos: The U.S. Telecommunications Sector Since 1996* (Washington, DC: Brookings Press 2004). [hereinafter *Competition and Chaos*]

88. Ibid, at 9-10 (manuscript).

89. Kevin A. Hassett/Zoya Ivanova/Laurence J. Kotlikoff, Increased Investment, Lower Prices—the Fruits of Past and Future Telecom Competition, Sept. 2003.

90. Anna Maria Kovacs/Kristin Burns, 'The Status of 271 and UNE Platform in the Regional Bells' Territories', Commerce Capital Markets, Apr. 2002.

91. Billy Jack Gregg, 'A Survey of Unbundled Network Element Prices in the United States', National Regulatory Research Institute (2001, 2002, 2003). Crandall notes that there does not seem to be academic agreement as to what, exactly, the regulated UNE-P rates are for each state at any point in time.

greatest in those states that reduced their UNE-P rates.⁹² Crandall found that a simple regression of the UNE-P rate in 2002 on the FCC's measure of costs, the state regulatory variables (such as price cap and rate freeze dummies, and the Bell company's 1996-99 capital spending in that state) provides a statistically significant negative coefficient on the 1996-99 capital spending.⁹³ He concluded that greater capital expenditures by Bell companies between 1996 and 1999 were associated with lower UNE-P rates in 2002.⁹⁴ Crandall observed that this finding may be an indication that regulators 'punish' investment by simply reducing the rate at which the investing company is obligated to lease its platform to competitors.⁹⁵

Other empirical work on this topic is less persuasive. For example, the Phoenix Center Policy Bulletin #6 purports to show that the decline in ILEC investment was attributable to factors other than UNE-P pricing and that, if anything, the pricing of UNE-P caused the decline in investment to be smaller than it would have been otherwise.⁹⁶ In a critique of that study, Thomas W. Hazlett, Arthur M. Havener, and Coleman Bazelon found empirically that the effect of UNE-P on ILEC investment is negative and statistically significant.⁹⁷ The fact that RBOC revenue and investment has been reduced relative to historic averages implies that mandatory unbundling in the United States did not achieve its intended effect. We turn to the question of CLEC investment in the next sections on entry barriers and the stepping stone hypothesis.

Investment activities during the late 1990s were undoubtedly affected by exceptional capital market conditions. But capital expenditure by CLECs was modest even when considered in terms of the way in which the CLECs have applied their resources. For example, an analysis of financial statements of EarthLink and Covad, two data CLECs, suggests that the ratio of capital expenditure to sales was 5 to 6 percent in 2001 and 2002, compared to a ratio of 20 to 25 percent for ILECs such as Verizon, SBC, and BellSouth.⁹⁸ Z-Tel and Citizens Communication, two voice CLECs, spent \$55 million and \$270 million, respectively, on renting unbundled loops in 2003, but incurred less than \$20 million in capital expenditure between them during the same period.⁹⁹

2. Entry Barriers

The second rationale for mandatory unbundling is that, without that particular form of regulatory intervention, market forces cannot deliver facilities-based competition. In the United States, cable telephony appears to disprove that proposition. According to the National Cable Television Association (NCTA), the number of cable telephony subscribers in the United States increased from 180,000

92. See *Competition and Chaos*, above n 87, at 14-15, 17-18 (manuscript).

93. *Ibid.* at 20 (manuscript)

94. *Ibid.*

95. *Ibid.*

96. Phoenix Center, *UNE-P Drives Bell Investment: A Synthesis Model*, Policy Bulletin No. 6 (2003), (available at <http://www.phoenix-center.org/PolicyBulletin/PolicyBulletin6Final.pdf>)

97. Declaration of Thomas W. Hazlett, Arthur M. Havener & Coleman Bazelon on Behalf of Verizon, In the Matter of Petition for Forbearance from the Current Pricing Rules for Unbundled Network Elements, WC Dkt. No. 03-157 (Sept. 2003).

98. Sales and capital expenditure data were taken from company annual reports.

99. Capital expenditure data were taken from company annual reports.

in the first quarter of 2000 to 2.5 million by September 2003.¹⁰⁰ In addition to the deployment of circuit-switched telephony, many companies have begun trials or are launching voice over Internet protocol (VoIP) service. For example, in 2003 Cablevision launched Optimum Voice VoIP throughout its New York City service area of four million homes.¹⁰¹ As of April 2004, Cablevision's customers received unlimited local and long-distance service, caller ID, call waiting, call return, three-way calling, call forwarding, and emergency 911 service for \$34.95.¹⁰² Other forms of platform competition, such as wireless local loop (WLL), were still in a nascent state in the United States as of May 2004. Although fixed wireless connections increased from 50,000 in December 1999 to 309,000 in June 2003 (an increase of 600 percent), fixed wireless connections accounted for only 1.3 percent of total high-speed connections in the United States.¹⁰³

In its *Third Report* in 1999, however, the FCC dismissed the emergence of cable telephony as a substitute for the ILECs' fixed-line networks:

We also disagree with the incumbent LECs' argument that cable television service offers a viable alternative to the incumbent's unbundled loop. Cable service is largely restricted to residential subscribers, and generally supports only one-way service, not the two-way communications telephony requires. Moreover, we conclude that declining to unbundle loops in areas where cable telephony is available would be inconsistent with the Act's goal of encouraging entry by multiple providers. Given that neither mobile nor fixed wireless can yet replace wireline service, if we were to take the incumbents' approach, consumers might be left to choose [sic] between only the cable company and the incumbent LEC.¹⁰⁴

The FCC's reasoning is unpersuasive. If two facilities-based carriers offer a similar service, and if the first carrier is not compelled to share its network with rivals, then consumers would no longer be subject to monopoly prices for local services. Moreover, the FCC's suggestion that cable infrastructure supports only one-way service is outdated given that, as of June 2003, cable modems accounted for nearly two-thirds of all residential broadband subscriptions,¹⁰⁵ which is clearly a two-way service.

When the availability of cable telephony was on the verge of ubiquity in late 2003, the FCC was forced to offer a different explanation for why the threat of cable telephony should be discounted:

As a general matter, while these [cable] systems are increasingly being used for the delivery of retail narrowband and broadband services (e.g., telephony and high-speed Internet access services), the record indicates that such systems are not being used currently to provide wholesale local loop offerings that might substitute for access to incumbent LECs' loop facilities. Some cable companies also have augmented their networks to enable the provision of two-way voice telephony services. For such services, the cable infrastructure serves as a replacement for loops. At this time, however, deployment of voice telephony by

100. National Cable Television Association, Statistics & Resources (available at <http://www.ncta.com/Docs/PageContent.cfm?pageID=86>).

101. *Ibid*

102. *Ibid*

103. See FCC High-Speed Services, above n 48, at 6 (tbl. 1).

104. See Third Order, above n 17, at ¶ 189.

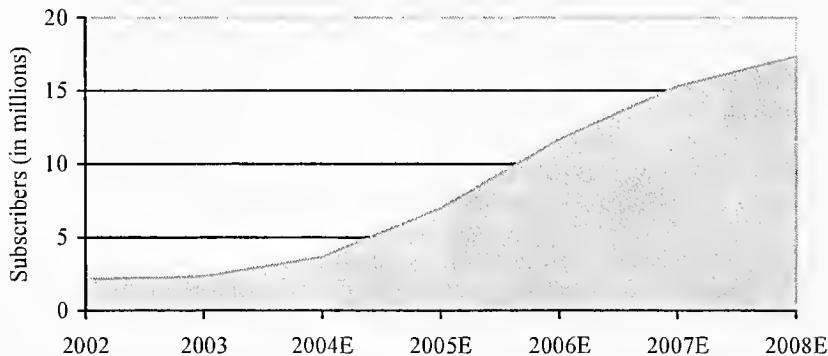
105. See FCC High-Speed Services, above n 48, at 10 (tbl. 3).

cable companies has been substantially exceeded by the deployment of cable modem service.¹⁰⁶

Hence, the FCC argued that unbundling of the ILECs' network is necessary because cable operators were not inclined to share their own network with rivals at marginal cost. It bears emphasis that the D.C. Circuit rejected this very rationale for mandatory sharing of broadband in its May 2002 decision, explaining that competition removes the reason for mandatory sharing.¹⁰⁷ To date, the FCC has refused to recognize the effect of inter-platform competition to fixed line telephony despite the D.C. Circuit's repeated admonitions that such competition cannot be ignored.

In a January 2004 report, Bernstein Research raised its cable telephony subscriber forecasts to account for 'cable operators' accelerated telephony rollout plans.¹⁰⁸ Figure 4 shows the projected growth of cable telephony.

Figure 4A: Projected Growth of Cable Telephony Through 2008



Source: Bernstein Research, *U.S. Telecom and Cable: Faster Rollout of Cable Telephony Means More Risk for RBOCs, Faster Growth for Cable* (9 January 2004) at Exhibit 1.

As Figure 4 shows, Bernstein Research expects cable MSOs to acquire 15.5 percent of consumer fixed primary access lines in the United States by 2008.¹⁰⁹ In May 2004, Comcast, the nation's largest cable company, announced that it plans to offer phone service to half of the households reached by the company's cable systems by the end of 2005 and to all 40 million of them by the end of 2006.¹¹⁰ Verizon perceives the threat posed by cable telephony to be significant. Verizon plans to begin selling video over fiber optic lines to homes and businesses in 2005, which is 'part of a long-term strategy to fight cable companies on their own turf

106. Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, Deployment of Wireline Services Offering Advanced Telecommunications Capability, CC Dkt. Nos. 01-338, 96-98, 98-147, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 F.C.C. Rcd. 16,978, 16,979 ¶ 229 (2003) [hereinafter *Section 251 Review*].

107. See USTA, above n 8, at 428.

108. Bernstein Research, *U.S. Telecom and Cable: Faster Rollout of Cable Telephony Means More Risk for RBOCs, Faster Growth for Cable*, at 3 (17 December 2003).

109. *Ibid*

110. Peter Grant, *Wall St. J.*, 26 May 2004, at A3.

before they erode too much of Verizon's traditional telephone business.¹¹¹ Verizon has already applied for licenses for cable franchises in several states.¹¹²

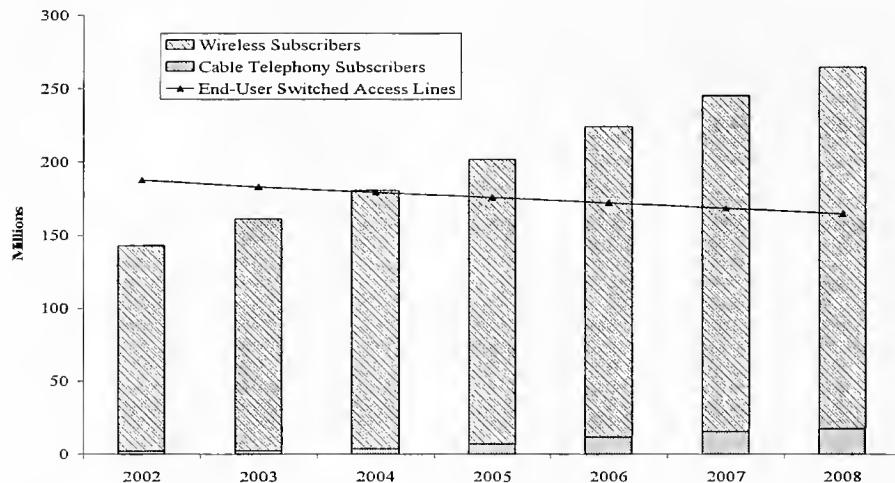
Wireless phone service also constrains the ability of ILECs to raise the price of voice services. There is a growing evidence of 'wireless substitution' in the United States, which documents the degree to which consumers perceives wireless phones to be substitutes for fixed line connections.¹¹³ Figure 4B shows the combined lines for cable and wireless through 2008.

111. Justin Hyde, *Reuters News*, 19 May 2004, *1

112. Ibid

113. See, e.g., Cannon Carr/Gregor Dannacher, 'Can Wireline Cannibalization Save Wireless ARPU in 2003?', CIBC World Markets, 11 December 2002, at 8 (estimating that wireless minutes in the United States have now displaced roughly 30 percent of total wireline minutes). See also *Health of the Telecommunications Sector: A Perspective from Investors and Economists*, before the House Subcommittee on Telecommunications and the Internet, 108th Cong. (5 February 2003) (statement of Blake Bath, Managing Partner, Lehman Brothers); *Health of the Telecommunications Sector: A Perspective from Investors and Economists*, before the House Subcommittee on Telecommunications and the Internet, 108th Cong. (5 February 2003) (statement of Robert Crandall, Senior Fellow, The Brookings Institute); Linda Mutschler *et al.*, *The Next Generation VII*, Merrill Lynch, Equity Research, 21 February 2003, at 28-29, 38-42.

Figure 4B: Projected Growth of Cable Telephony & Wireless and Projected Decline of End-User Switched Access Lines Through 2008



Sources: Bernstein Research, U.S. Telecom and Cable: Faster Rollout of Cable Telephony Means More Risk for RBOCs, Faster Growth for Cable (9 January 2004) at Exhibit 1; Cellular Telecommunications & Internet Association (CTIA), CTIA's Semi-Annual Wireless Industry Survey Results, at 3 (rel. Mar. 2004); FCC, Local Telephone Competition: Status as of 30 June 2003, at 5 (tbl. 1) (rel. 22 December 2003).

Notes: Wireless and cable telephony subscribers for 2004-2008 are estimates. End-user switched access lines for 2003-2008 are estimates. Forecasts for wireless subscribers are based on OLS regression coefficient estimates using semi-annual wireless subscriber data from June 1997-December 2003. Forecasts for end-user switched access lines are based on OLS regression coefficient estimates using actual semi-annual switched access lines data from December 2000-June 2003.

As Figure 4B shows, the combined number of wireless and cable telephony subscribers as of 2004 *exceeds* the number of end-user switched access lines. Wireless substitution is not unique to the United States. A recent JD Power and Associates survey in May 2004 revealed that 53 percent of U.K. 'contract customers use mobile as main method of communication.'¹¹⁴ The emergence of facilities-based competition for voice customers implies that the rationale for mandatory unbundling based on insurmountable barriers to entry is not substantiated in the United States.¹¹⁵

3. Stepping-Stone Hypothesis

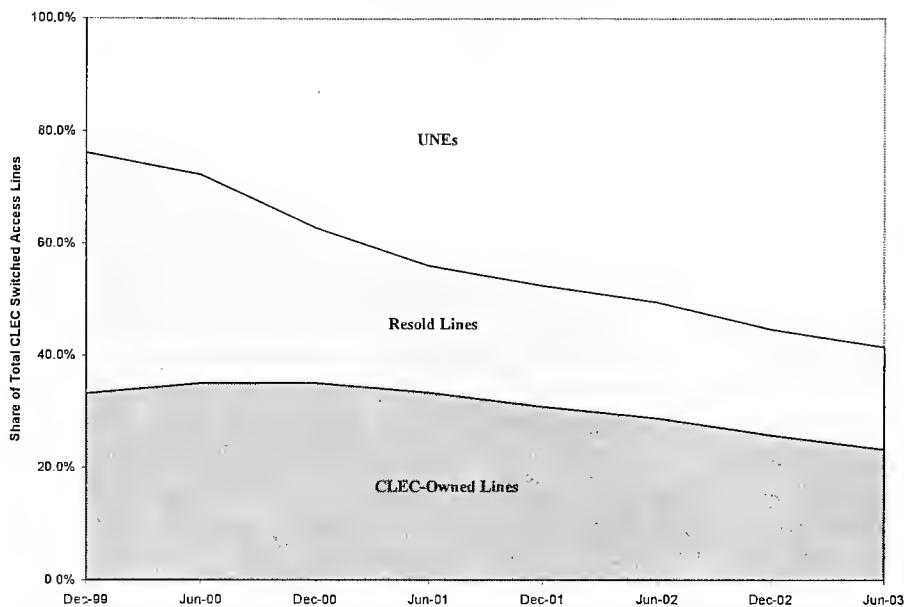
The stepping-stone hypothesis implies that CLECs will migrate toward facilities-based entry over time as they gain market share. One way to measure the effect of mandatory unbundling on the method of CLEC entry is through time-series analysis. Figure 5 demonstrates that, contrary to the stepping-stone hypothesis,

114. JD Power and Associates, Consumer Survey, May 2004.

115. Indeed, AT&T has recognized the displacement effect of wireless service on its long distance business. See, e.g., AT&T Corp., 2003 SEC Form 10-K, filed 15 March 2004 ('For example, consumer long distance voice usage is declining as a result of substitution to wireless services, internet access and e-mail/instant messaging services, particularly in the 'dial one' long distance, card and operator services segments.').

CLECs are, in the aggregate, increasingly relying on UNE-P as their preferred mode of entry.

Figure 5: CLEC Lines by Type, 1999-2003



Source: FCC, Local Telephone Competition: Status as of 30 June 2003, at 6 (tbl. 3) (rel. 22 December 2003).

Note: UNEs include UNE-loops and UNE-platform.

The vertical axis is the share of total CLEC switched access lines: the sum of the shares across all types is 100 percent. Whereas CLECs relied on UNEs for 23.9 percent of their lines in December 1999, by June 2003, UNE lines accounted for 58.5 percent of all CLEC lines.¹¹⁶ Of all UNE lines in December 2002, 70.5 percent were acquired in combination with the ILEC's switch.¹¹⁷ The availability of wholesale access appears to have discouraged CLECs from investing in their own facilities (including switches) over time.

The increasing share of UNEs might be attributable to entry by new CLECs, which rely on UNEs extensively in their early stages. Stated differently, it is possible that mature CLECs have, in fact, made the transition to facilities-based lines but entry by new UNE-based CLECs is artificially inflating the share of CLEC lines that are UNEs. To examine this hypothesis, we charted the progress of 17 specific CLECs from the first quarter 2000 through the fourth quarter 2000. If the stepping stone hypothesis were valid, then one would expect to observe the share of facilities-based lines for a given CLEC to increase over time.

116. See FCC Local Competition Report 2003, above n 37, at tbl. 3.

117. Ibid, at tbl. 4

Table 2: Share of Facilities-Based Lines by Quarter

CLEC	1Q00 (Percent)	2Q00 (Percent)	Change in Percentage Points	4Q00 (Percent)	Change in Percentage Points
Electric Lightwave	66	66	0	68	2
Focal	0	0	0	0	0
Frontier	0	0	0	0	0
GST	47	47	0	Bankrupt*	NA
Adelphia Business Solutions	42	42	0	39	-3
ICG	65	55	-10	Bankrupt*	NA
Intermedia	19	19	0	22	3
McLeodUSA	2	5	3	6	1
Nextlink	25	26	1	50	24**
RCN	30	35	5	42	7
Teleport	80	80	0	80	0
Teligen	100	100	0	100	0
US LEC	0	0	0	0	0
Winstar	38	42	4	52	10
MCI (Brooks & MFS)	60	60	0	60	0
ATT	20	20	0	20	0
Sprint	0	0	0	0	0
<i>Average</i>			0.17%		2.93%
<i>Fraction of CLECs That Increased Their Share of Facilities-Based Lines</i>			4 of 17 (23.5%)		5 of 17 (29.4%)

Sources: Credit Suisse-First Boston, Telecom Services—CLECs, 5 June 2000, tbl. 14; Credit Suisse-First Boston, Telecom Services—CLECs, 12 September 2000, tbl. 14; Credit Suisse-First Boston, Telecom Services—CLECs, 11 April 2001, tbl. 14;

Note: *Bankrupt before Credit Suisse-First Boston produced final report in April 2001. ** The facilities-based lines of XO Communications account for half of facilities-based share. Nextlink and Concentric merged to become XO Communications. Therefore, Nextlink increased its facilities-based share merely by buying a facilities-based CLEC.

As Table 2 shows, a very small share of CLECs that were covered by Credit Suisse-First Boston in 2000 increased their share of facilities-based lines before the telecommunications meltdown of 2001. Roughly one-quarter of the firms in the sample increased their share of facilities-based lines in 2000. Many of the CLECs continued to rely on UNEs to the same extent during that time period—the share of facilities-based lines was unchanged for nearly half (8 of 17) firms in the sample. Two CLECs, Adelphia and ICG, allowed their share of facilities-based lines to decrease during 2000. The increase in facilities-based share across all 17 firms was only 0.17 percentage points from the first quarter 2000 through the second quarter 2000 and only 2.93 percentage points from the second quarter 2000 through the fourth quarter 2000. Several of the firms covered by Credit Suisse-First Boston, such as Teligen and Winstar, filed for bankruptcy in the first and second quarters in 2001. To the extent that CLECs that embraced a facilities-based approach were

more likely to be successful¹¹⁸ and therefore more likely to be covered by Credit Suisse-First Boston, our results are likely biased toward greater facilities-based investment.

Other empirical analyses support the position that mandatory unbundling does not provide a stepping-stone to facilities-based investment. For example, Crandall, Ingraham, and Singer find that the share of CLEC lines that are facilities-based is lower in states where the UNE rental rates are lower, which suggests that unbundling decreases facilities-based competition in the short term.¹¹⁹ Using the FCC's data on UNE and facilities-based investment, they find that the relationship between the log of the ratio of the loop rate and the build-out cost is positively related to the log of the ratio of facilities-based lines to UNE lines. That relationship is significant statistically at the 1 percent level of confidence in all regressions. That model cannot rule out the possibility, however, that low UNE rates encourage CLECs to rent at first, and then build facilities once they have some market experience. But the notion that low UNE rates stimulate future facilities-based investment appears to be undermined by other results. In particular, a regression of the *change* in facilities-based investment over time indicates that facilities-based lines growth relative to UNE growth was faster in states where the cost of UNEs was higher relative to the cost of facilities-based investment. Based on this initial evidence, Crandall, Ingraham, and Singer argue that the burden of proof should now shift to the competitive local exchange carriers. If there is no evidence that low UNE rates stimulate facilities-based CLEC investment in future periods, then the entire unbundling experiment should be reconsidered.

James Eisner and Dale E. Lehman also evaluated the effect that UNE prices have on the amount and type of CLEC entry in that state.¹²⁰ Eisner and Lehman considered three basic forms of entry: facilities-based, pure resale, and UNE-P leasing. Although they did not offer a hypothesis regarding the effect of lower UNE-P rates on facilities-based entry, they did anticipate that states with lower UNE-P rates would have more non facilities-based entry.

Eisner and Lehman used FCC data comprised of CLEC form 477 filings from 1999 on. They used ordinary least squares estimation to examine the three basic forms of entry. The total number of each of these types of lines is modelled independently as the dependent variable in an equation involving wholesale prices, retail prices, demographic information, and regulatory variables as the independent variables. Eisner and Lehman found no empirical evidence that states with lower UNE rates experience more CLEC entry, except in those states where the incumbent ILEC received section 271 approval, which enables ILECs to offer long-distance service as a carrot for granting access to CLECs. However, Eisner and Lehman did find that states with lower UNE rates experience less *facilities-based* entry. They also concluded that section 271 approval is a complicating

118. See, e.g., Robert W. Crandall, 'An Assessment of the Competitive Local Exchange Carriers Five Years After the Passage of the Telecommunications Act', Criterion Working Paper, 27 June 2001 (finding evidence that CLECs were best able to produce revenue growth by building their own networks or significant parts of their own networks).

119. Robert W. Crandall/Allan T. Ingraham/Hal J. Singer, 'Do Unbundling Policies Discourage CLEC Facilities-Based Investment?', *Topics in Economic Analysis and Policy Section*, 4 Berkeley Electronic Journals in Economic Analysis and Policy (forthcoming 2004).

120. James Eisner/Dale E. Lehman, 'Regulatory Behavior and Competitive Entry', Presented at the 14th Annual Western Conference Center for Research in Regulated Industries, 28 June 2001.

factor in modelling the effects of UNE rates on CLEC entry and investment decisions.

4. Wholesale Competition

The FCC's vision of a network of networks does not appear to have materialized in the U.S. residential market. For certain sectors of the U.S. enterprise market, however, several CLECs have established themselves as pure wholesale providers of local access. In its *Triennial Review Order*, the FCC reported that '[t]o a smaller degree, some competitive LECs began to provide selected transport services to other competitive LECs on a wholesale basis.'¹²¹ Since 1998, CLEC-owned fiber has increased from 100,000 to 184,000 route miles. In addition, wholesale suppliers of fiber continue to invest in facilities that are being used by all carriers.¹²² The FCC noted that much of this interoffice transport is long-haul intercity, rather than local.

With respect to loop deployment for the mass market, the FCC concluded that, as of February 2003, 'such systems are not being used currently to provide wholesale local loop offerings that might substitute for access to incumbent LECs' loop facilities.'¹²³ With respect to enterprise loops, the FCC found that 'some competitive carriers have been able to deploy certain high-capacity loops to particular customer locations and that some wholesale alternatives also exist at particular customer locations.'¹²⁴ The FCC observed that CLECs 'have deployed fiber that enables them to reach customers entirely over their own loop facilities,' but that such deployment is typically done at the Ocn level.¹²⁵ The FCC noted that the evidence of self-deployment and wholesale availability of DS3 loops 'is somewhat greater than for DS1s and is directly related to location-specific criteria.'¹²⁶ Based on that evidence of replicability, the FCC concluded that CLECs would not be impaired at the Ocn level without access to ILECs' facilities.¹²⁷ Because the record also confirmed that 'it is economically possible to self-deploy at a three DS3 loop level to a particular customer location,' the FCC ruled that unbundled access to DS3 loops would be limited to a total of two DS3s per requesting carrier to any single customer location.¹²⁸ With respect to wholesale switching, the FCC found that CLEC switch deployment increased from 700 in 1999 to 1,300 in 2001.¹²⁹ The FCC ruled, however, that there was 'no evidence to show that third parties are currently offering switching on a wholesale basis' for the mass market.¹³⁰ In summary, a vibrant wholesale market appears to have emerged in enterprise switching, transport, and high-speed (DS3) loops only.

121. See *Triennial Review*, above n 8, at 31 ¶ 37.

122. BOC UNE Fact Report 2002 at III-8 to III-14.

123. See *Triennial Review*, above n 8, at 136 ¶ 222.

124. *Ibid.* at 126 ¶ 202 (emphasis added)

125. *Ibid.* at 177 ¶ 298

126. *Ibid.*

127. *Ibid.* at 193 ¶ 324

128. *Ibid.*

129. *Ibid.* at 267 ¶ 436

130. *Ibid.* at 271 ¶ 442

5. Other Observations about the Process

The Telecommunications Act retained the BOCs' interLATA prohibition while establishing, in section 271,¹³¹ a process—involving each state public utilities commission, the FCC, and the Department of Justice (DOJ), acting on a state-by-state basis—by which the BOCs could earn regulatory approval to enter the interLATA market within the regions in which they provide local exchange service. By 2004, the BOCs had received section 271 authorizations to provide in-region interLATA service in 48 states (long-distance customers in Alaska and Hawaii are not yet served by BOCs) and the District of Columbia.¹³² For the FCC, BOC entry into the in-region interLATA market has been ‘an incentive or reward for opening the local exchange market.’¹³³ That view implicitly subordinates the possible harm to consumers (in the form of delayed price reductions) from the restrictions on the BOCs while they seek that carrot.¹³⁴ In an article with Gregory Leonard published in the *Antitrust Law Journal*, we found that the average U.S. consumer received a savings of 8 to 11 percent on the monthly interLATA bill in the states where BOC entry occurred as compared to ‘control’ states where BOC entry had not occurred.¹³⁵ We also found that CLECs gained a substantial increase in cumulative share of the local exchange market in states where BOC entry occurred as compared to control states without BOC entry.¹³⁶ Finally, we found that there was no significant change in the local bill of the average consumer in states where BOC entry into interLATA service occurred as compared to those bills in the control states.¹³⁷

B. United Kingdom

Mandatory unbundling in the United Kingdom was first considered by the former telecommunications regulator, the Office of Telecommunications (OfTEL), in 1996. OfTEL stated that three facilities-based service providers would be *sufficient* to provide effective competition in the telecommunications market United Kingdom.¹³⁸ OfTEL acknowledged that at least three facilities-based service providers (including British Telecom (BT), a cable operator, and a radio access operator) already competed in many U.K. geographic markets.¹³⁹ Because of the strong level of existing and expected future facilities-based competition in the United Kingdom in July 1996, OfTEL decided that:

[a]ny move to allow operators to take over BT exchange lines would undermine past investments and jeopardize future plans. Our conclusion, therefore, is that direct connection to the BT Access Network would adversely affect the

131. 47 U.S.C. § 271.

132. See FCC, *RBOC Applications to Provide In-region, InterLATA Services Under § 271* (available at http://www.fcc.gov/Bureaus/Common_Carrier/in-region_applications/).

133. 1997 Michigan Section 271 Order, 12 F.C.C. Rcd. at 20,746 ¶ 388.

134. Jerry A. Hausman/Gregory Leonard/J. Gregory Sidak, ‘Does Bell Company Entry into Long-Distance Telecommunications Benefit Consumers?’, 70 *Antitrust L.J.* 463 (2002).

135. *Ibid*

136. *Ibid*

137. *Ibid*

138. OfTEL, OfTEL’s Policy on Indirect Access, Equal Access and Direct Connection to the Access Network, at ¶ 46, July 1996 (available at http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/competition/ access96.htm).

139. *Ibid*

development of competition and would not be in the interests of the UK consumer.¹⁴⁰

In short, Oftel recognized that mandatory unbundling would undermine the goals of dynamic efficiency.

From 1994 through 1997, regulation shifted in favor of infrastructure competition over service competition.¹⁴¹ In 1996, Oftel became convinced that 'the key to achieving a vibrant market for services provided over telecommunication networks is the promotion of fair, efficient and sustainable network competition.'¹⁴² This emphasis of infrastructure competition affected Oftel's treatment of issues such as number portability and equal access. The regulatory emphasis shifted back to service competition in 1998 with the issuance of several EU directives, which encouraged national regulators not to discriminate between firms that were building networks and those that were not.

In December 1998, Oftel released a consultation document that called for mandatory unbundling as a *necessary* condition for bringing higher bandwidth services to consumers.¹⁴³ Oftel cited four reasons why mandatory unbundling was needed in the United Kingdom.¹⁴⁴ First, BT, which supplied service to 85 percent of U.K. consumers, was not equipped in 1998 to provide DSL service.¹⁴⁵ Second, the forthcoming 1999 European Union review on telecommunications markets was anticipated to place local loop unbundling high on its agenda.¹⁴⁶ Third, the U.K. government had stressed the importance of the deployment of new technologies to all consumers.¹⁴⁷ Fourth, other countries, such as the United States, had already implemented mandatory unbundling.¹⁴⁸ Although U.K. consumers already benefited from platform competition, Oftel felt that mandatory unbundling was important for the United Kingdom to maintain its 'competitive advantage'¹⁴⁹ vis-à-vis the rest of the world.

In November 1999, Oftel announced that unbundled loops and collocation would become available to competitive providers.¹⁵⁰ BT was required by July 2001

140. Ibid, at ¶¶ 46-47. Facilities-based investment by BT's competitors existed even in the early 1990s. In particular, ILECs in the United States and Canada invested in U.K. cable companies. Those cable companies then began to offer telephone services to their customers. See, e.g., Declaration of Oliver E. Williamson, Motion of Bell Atlantic Corporation, BellSouth Corporation, Nynex Corporation, and Southwestern Bell Corporation to Vacate the Decree at ¶¶ 17-22, United States of America, v. Western Electric Co., Inc. and American Telephone and Telegraph Company, Civ. Act. No. 82-0192 (D.C. Cir. 1994). Consequently, by January 2004, over 400,000 homes in the U.K. were offered telephone service by a cable operator. *Id.*

141. See, e.g., Damien Geradin/Michel Kerf, *Controlling Market Power in Telecommunications: Antitrust vs Sector-Specific Regulation* (Oxford University Press 2003) 163.

142. Oftel, Promoting Competition in Services over Telecommunication Networks, June 1996.

143. Oftel, Access to Bandwidth: Bringing Higher Bandwidth Services to the Consumer, Dec. 1998 (available at http://www.ofcom.org.uk/static/archive/oftel/publications/1995_98/competition/llu1298.htm) [hereinafter *Oftel Access to Bandwidth December 1998*].

144. Ibid, at ¶ 1.3

145. Ibid

146. Ibid

147. Ibid

148. Ibid

149. Ibid

150. Oftel, Access to Bandwidth: Delivering Competition for the Information Age, Nov. 1999 (available at <http://www.ofcom.org.uk/static/archive/oftel/publications/1999/consumer/a2b1199.htm>) [hereinafter *Oftel Access to Bandwidth 1999*].

to allow unbundling and collocation within its network.¹⁵¹ In its *Access to Bandwidth Report*, Oftel's provided the following rationale for pursuing mandatory unbundling:

The best way to achieve the variety of services that consumers want at reasonable prices is to promote effective competition in the provision of access to and delivery of these services. In examining the case for action, Oftel has considered the level of demand in various segments of the market, the supply of products available and whether there are barriers to the competitive delivery of higher bandwidth access and services. The conclusion is that regulatory action is needed to introduce competition into the upgrade of the local loop.¹⁵²

Oftel intended that mandatory unbundling would lead to enhanced competition in broadband services.

The Trade and Industry Committee of the House of Commons expressed a similar vision in 2001 for mandatory unbundling in the United Kingdom. In particular, the Trade and Industry Committee suggested that a new entrant would provide advanced services by augmenting the existing copper loop with its own equipment:

When the process of LLU is completed, end customers will be able to receive a range of higher bandwidth services from an operator other than BT. The service provider will attach their own broadband equipment to the loop at the exchange and provide the end customer with matching equipment.¹⁵³

The Committee acknowledged, however, that mandatory unbundling was not a necessary condition for the deployment of new services in the telecommunications market. The Committee recognized that facilities-based competition from several sources could develop, but it believed that mandatory unbundling would significantly hasten the deployment of broadband services to consumers:

Local Loop Unbundling is by no means the only method of opening up access to broadband services. Cable, satellite or wireless local loops can all be used to deliver services. However, local access networks were generally rolled out by incumbent telecommunications operators over significant periods of time, protected by exclusive rights and often funded through monopoly rents. Other operators cannot match the economics of scale and coverage of these incumbent operators.¹⁵⁴

Thus, the primary intent of mandatory local loop unbundling in the United Kingdom was to expedite the delivery of advanced services to consumers, even

151. For a thorough discussion of the regulatory requirements under mandatory unbundling in the United Kingdom, see Geradin & Kerf, above n 141, (Oxford: Oxford University Press 2003) 172-174. Along with the requirement of mandatory unbundling, the Director General of Telecommunications (DGT) permitted that rates for mandatory unbundling should (1) permit the recovery of an appropriate share of common cost, (2) permit the recovery of reasonably incurred long-run incremental cost, (3) may differ across BT's service area according to varying economic circumstances, and (4) should include a reasonable return on capital employed. *Ibid.*, at 173.

152. See Oftel Access to Bandwidth 1999, above n 150, at ¶ 2.4.

153. Select Committee on Trade and Industry, Sixth Report, 20 March 2001, at ¶ 4 (available at <http://www.parliament.the-stationery-office.co.uk/pa/cm200001/cmselect/cmtrdind/90/9006.htm>) [hereinafter *Select Committee Sixth Report*].

154. *Ibid.*, at ¶ 6

though regulators conceded that natural market forces might provide competitive offerings within a reasonable period of time.

1. Retail Competition

a. Pricing

One rationale for mandatory unbundling is increased competition in retail services, which is characterized by lower retail prices.¹⁵⁵ Pricing data from Ofcom indicate that mandatory unbundling, which was implemented in the United Kingdom in the middle of 2001, has not measurably decreased prices of telecommunications service. According to Ofcom, from 1996 through the middle of 2001, the time at which BT was required to begin unbundling, prices for residential service decreased by approximately 20 percent.¹⁵⁶ In contrast, prices for residential service slightly increased after BT was required to unbundle. Similarly, the price of telecommunications service for businesses decreased by 40 percent between 1996 and mid-2001, but it has not declined measurably since mandatory unbundling was implemented.

Proponents of mandatory unbundling suggest that, because very few U.K. consumers receive their service through a UNE-based CLEC, the unbundling experiment has not been allowed to play its course. For example, over forty companies expressed interest in providing telecommunications service in the United Kingdom via local loop unbundling in 2000.¹⁵⁷ But by 2002, only seven carriers were actually providing or were attempting to provide local telephone service via unbundled access.¹⁵⁸ When discussing the unbundling experience in the United Kingdom, a 2002 OECD report conceded that 'the policy of unbundling the local loop has failed, as yet, to generate the benefits expected.'¹⁵⁹

Although UNE-based competition for residential voice customers has not flourished in the United Kingdom, CLECs have provided broadband Internet service extensively through unbundled access. As of July 2003, entrants providing broadband service through unbundled access increased their DSL lines to over 536,000, which nearly equalled the total DSL customers of BT.¹⁶⁰ Almost all of these new entrants provided high-speed Internet service, as only 3,500 of the new

155. Ofcom has stated that 'competitive markets are most likely to promote innovation and increased productivity with resulting benefits in terms of lower prices and better quality and choice for consumers.' See Ofcom Access to Bandwidth 1998, above n 143, at ¶ 4.2. Ofcom has also maintained that regulatory intervention 'should be limited to situations where competition is either not possible or is not working effectively or where costs and benefits accruing to third parties are not taken into account by market participants.' *Ibid.* By pursuing a policy of mandatory unbundling, Ofcom believed that it could correct a market failure which, once eliminated or reduced, would result in lower retail prices.

156. Ofcom, The UK Telecommunications Industry Market Information: 2001/02, Mar. 2003, at 7 (available at http://www.ofcom.org.uk/static/archive/ofcom/publications/market_info/2003/ami0303.pdf).

157. OECD Reviews of Regulatory Reform: Regulatory Reform in the UK—From Transition to New Regulation Challenges, 2002.

158. *Ibid*

159. *Ibid*

160. Commission of the European Communities, *Ninth Report from the Commission on the Implementation of the Telecommunications Regulatory Package: European Telecoms Regulation and Markets 2003*, Annex I, 11 November 2003, at 59 [hereinafter EU Ninth Report].

entrants' 536,000 unbundled lines were used to provide *both* voice and data service.¹⁶¹

Retail competition in broadband services is intense and prices have been falling. It is not obvious, however, that mandatory unbundling caused the price decline. Facilities-based cable operator ntl launched the first U.K. broadband offering in April 1999, followed by Telewest in March 2000. According to the OECD, 'in the absence of a competitive product from BT the initial prices were relatively high and service levels only needed to exceed those of ISDN.'¹⁶² Although BT did not launch its first DSL offering until mid-2000, owing to technical problems, lines were not widely available until May 2001.¹⁶³ At the end of 2000, the world's fourth largest economy ranked just 22nd in terms of broadband subscribers.¹⁶⁴ The launch of retail DSL products by BT and various third parties (via BT's wholesale offer) began a period of intense price competition between broadband providers.¹⁶⁵ By the middle of 2003, price reductions had transformed the U.K. broadband market from one of the most expensive in the OECD to the cheapest, as observed in Oftel's survey of the broadband market.¹⁶⁶ Hence, price decreases in the U.K. market can be directly linked to competition between DSL and cable providers.¹⁶⁷ In the months after the launch of BT's DSL service, ntl and Telewest responded with significant price reductions, such that, by mid-2001, prices were around 50 percent of their launch levels and about 35 percent below those of BT Openworld.¹⁶⁸ BT responded in March 2003 with a 25 percent price reduction, which provided the trigger for a series of price cuts by other ISPs using BT's resale service.¹⁶⁹

b. Investment

Another rationale for mandatory unbundling is the expectation that it will increase the ILEC's incentive to upgrade its network. Table 3 lists BT's investment in fixed capital assets for its fiscal years ending in March between 1996 and 2003.

161. Ibid

162. OECD, The Development of Broadband Access in OECD Countries 42 (29 October 2001) [hereinafter *OECD 2001 Broadband Study*].

163. Ibid

164. Ibid

165. Ibid

166. Oftel's Internet and Broadband Brief, 12 October 2003 (available at http://www.ofcom.org.uk/legacy_regulators/oftel/oftel_internet_broadband_brief/?a=87101#10).

167. *OECD 2001 Broadband Study*, above n 162, at 42.

168. Ibid

169. Ibid

Table 3: BT Investment in Fixed Capital Assets: Fiscal Years 1996-2003

Fiscal Year	Fixed Capital Investment (£ billion)
1993	0.74
1994	1.31
1995	1.08
1996	1.06
1997	1.27
1998	1.71
1999	1.83
2000	5.88
2001	5.20
2002	1.22
2003	0.56

Source: BT, Annual Report and Form 20-F 2003 at 27 (released 2003) available at: <http://www.btplc.com/report/report03/index.htm>; BT, Annual Report and Form 20-F 2000 at 26 (Released March 2000) available at: <http://www.btplc.com/Sharesandperformance/Howwehavedone/Financialreports/Annualreports/Annualreportsarchive.htm>.

The data in Table 3 indicate that in its fiscal year 1999, BT spent £1.8 billion on fixed-capital investment. During 2000, BT spent £5.8 billion on fixed capital investment,¹⁷⁰ and in 2001 BT spent £5.2 billion on fixed capital investment.¹⁷¹ In fiscal year 2002, BT reduced its investment to £1.2 billion,¹⁷² and in fiscal year 2003, BT spent only £555 million on fixed capital investment.¹⁷³ Hence, BT's investment in fixed capital assets reached its apex at the end of fiscal year 2001, which ended in March 2001, before mandatory unbundling was introduced in the United Kingdom. Of course, the end of BT's fiscal year 2001 coincided almost perfectly with the bursting of the 'telecommunications bubble,' which likely contributed, at least in part, to the decrease in BT's investment.

BT's pattern of investment corresponds closely with the pattern of investment by the entire U.K. telecommunications industry. From 1994 through 2000, telecommunications investment in the United Kingdom increased substantially. Approximately £4 billion was invested by the telecommunications industry in 1994, accounting for 4 percent of total investment in the United Kingdom that year.¹⁷⁴ By 2000, nearly £12 billion was invested by the telecommunications industry. Between 2000 and 2001, telecommunications investment in the United Kingdom fell by approximately £4 billion.

2. Entry Barriers

Mandatory unbundling is considered necessary whenever market forces cannot be relied upon to produce facilities-based competition. An analysis of platform competition for broadband services in the United Kingdom, however, reveals that

170. BT, Annual Report & Form 20-F 2003, at 27 (available at <http://www.btplc.com/report/report03/index.htm>).

171. Ibid

172. Ibid

173. Ibid

174. OFCOM, Strategic Review of Telecommunications: Phase I Annex F-J 35 (Spring 2004) available at: http://www.ofcom.org.uk/codes_guidelines/telecoms/strategic_review_telecoms/?a=87101#remit.

entry unrelated to unbundling currently exists. As of July 2003, BT operated over 563,000 DSL lines in the United Kingdom,¹⁷⁵ while cable operators served nearly 1.1 million customers.¹⁷⁶ Given the nearly two-to-one advantage of cable modem service to BT's DSL service in the United Kingdom, it is not reasonable to presume that BT has market power in the broadband Internet services market, especially in those geographic markets passed by cable networks.

Cable operators ntl and Telewest also compete vigorously with BT for residential and business voice customers. U.K. cable companies have offered residential telephone service for nearly a decade. When the cable companies first deployed coaxial cable for television services, they simultaneously laid regular copper phone lines in the same trenches.

Cable telephony's share of fixed voice connections has steadily increased over time. In March 1998, cable operators ntl and Telewest provided telephone service to 9.1 percent of residential customers.¹⁷⁷ By December 2003, their combined share of the residential voice market had increased to 16.6 percent.¹⁷⁸ Hence, in households passed by cable networks, cable operators have roughly 33 percent of fixed-line voice connections.¹⁷⁹ The increase in the cable companies' share of residential voice services in the United Kingdom came largely at the expense of BT, whose share fell from 86.2 percent to 82.7 percent between March 1998 and December 2003.¹⁸⁰

Cable companies' share of business voice service revenues in the United Kingdom has also increased. Between 1996 and 1997, ntl and Telewest controlled only 2.6 percent of business voice revenues, but by December 2003 those companies had acquired a 4.8 percent share.¹⁸¹ Cable's share of business voice revenues is smaller than its share of residential voice revenues because cable operators must compete with several other facilities-based CLECs, including Colt Telecom Group (COLT), in the business sector.

COLT, which has operations in 32 cities in 13 European countries, competes directly with BT and cable operators for business customers. COLT established its metropolitan area network in London in 1993.¹⁸² It expanded its network to include Birmingham in December 2000 and Manchester in February 2002.¹⁸³ The COLT network is largely deployed on COLT's fully owned fiber, which when supplemented with current hardware, can reach multi-gigabit speeds on a single circuit. COLT targets its services to business users ('COLT interAccess') and

175. See EU Ninth Report, above n 160, at 59.

176. Ibid.

177. Ofcom, The UK Telecommunications Industry Market Information: 2001/02, Mar. 2003, at 27 (tbl. 8a) (available at <http://www.ofcom.org.uk/static/archive/ofcom/publications/ami0303.pdf>) [hereinafter 2003 UK Telecommunications Information Report].

178. Ofcom, Ofcom Fixed Telecoms Market Information Update, May 2004, at tbl. 7 (available at http://www.ofcom.org.uk/research/industry_market_research/m_i_index/telecoms_providers/fix_t_mkt_info/) [hereinafter Ofcom FTMI Update].

179. Ibid; Ofcom, ITC Multichannel Quarterly, July 2003 (available at http://www.ofcom.org.uk/research/industry_market_research/m_i_index/iv_radio_region/itc_market_info/cable_sal_stats/multichannel_q2_2003.doc) [hereinafter ITC Multichannel Quarterly].

180. Ibid; 2003 UK Telecommunications Information Report, above n 177, at 27 (tbl. 8a).

181. See 2003 UK Telecommunications Information Report, above n 177, at 32 (tbl. 13); Ofcom FTMI Update, *supra* note 178, at tbl. 11.

182. COLT, About Us (available at www.colt.net).

183. Ibid.

resellers of Internet access ('COLT InterTransit'). COLT also offers its business customers a full range of voice services.¹⁸⁴ Fidelity Investments owns 56 percent of COLT.¹⁸⁵ COLT expected to spend between £150 million and £200 million in capital expenditure in 2004, depending on customer demand.¹⁸⁶ As of March 2004, COLT reported having over 17,000 business customers across Europe.¹⁸⁷

BT's share of both residential and business voice revenues has decreased significantly since 1993. BT's share of residential voice revenues, which was nearly 100 percent in 1993, declined steadily to just below 70 percent in 2001.¹⁸⁸ Since 2001, when BT was required to unbundle the local loop, BT's share of residential revenues has remained constant at 70 percent. In 1993, BT controlled approximately 85 percent of the voice revenues in the business sector. That share, however, had steadily declined to below 60 percent by 2001. By 2003, BT's share of business voice revenues had decreased to approximately 52 percent.

3. Stepping Stone Hypothesis

As of mid 2004, it was not apparent that new entrants in the United Kingdom had used unbundled loops to evolve into facilities-based competitors. A lack of conversion from unbundled access to facilities-based service is likely due to the high level of facilities-based investment that already occurred *before* unbundling was mandated. In particular, entrants controlled 24.0 percent of the revenues for residential voice services by March 2001,¹⁸⁹ and 39.5 percent of the business revenues from voice services by March 2001.¹⁹⁰ The high level of facilities-based competition that predated the decision-making process for local loop unbundling raises serious issues as to whether mandatory unbundling was even needed for voice or broadband services in the United Kingdom by the time that Oftel mandated it in November 1999.

4. Wholesale Competition

A final rationale for mandatory unbundling is increased competition in the wholesale market, which is typically characterized by supply of alternative networks by CLECs for new entrants. The size of the wholesale market in the United Kingdom has grown considerably since the mid 1990s. Between 1996 and 2002, the wholesale market for voice services in the United Kingdom increased from £1.9 billion to £4.5 billion—a 130 percent increase.¹⁹¹ By March 2002, the largest share of the wholesale voice market, approximately 49.1 percent, was controlled by BT.¹⁹² Cable operators ntl, Telewest, and Cable & Wireless controlled approximately 19.9 percent of the wholesale voice revenues in the

^{184.} *Ibid*

^{185.} *COLT Telecom Group plc*, Hoover's Company Basic Records, 12 May 2004.

^{186.} Nic Fildes, Dow Jones Newswire, 22 April 2004,*¹

^{187.} *COLT Telecom expands metro optical services offering*, M2 Presswire, 9 March 2004,

*¹

^{188.} OFCOM, Strategic Review of Telecommunications: Phase I Annex F-J 35 (Spring 2004) available at: http://www.ofcom.org.uk/codes_guidelines/telecoms/strategic_review_telecoms/.

^{189.} *2003 UK Telecommunications Information Report*, above n 177, at 26 (tbl. 8).

^{190.} *Ibid*, at 32 (tbl. 13)

^{191.} *Ibid*, at 39 (tbl. 18)

^{192.} *Ibid*

United Kingdom.¹⁹³ The remaining 31 percent of the market was controlled by 'other operators.'¹⁹⁴

Business districts in most major cities and towns in the United Kingdom are served by facilities-based CLECs. These CLECs typically offer service to both business customers and CLECs for resale. Table 4 lists the facilities-based competition that incumbent BT faces for major markets in the United Kingdom.

Table 4: Facilities-Based Providers of Core Fibre and Metropolitan Area Networks

	C&W[1]	ntl	Telewest	Energis	Torch/ Kingston	WorldCom	Thus	Colt	Global Crossing
London - City	CORE & MAN			CORE & MAN		CORE & MAN		CORE & MAN	CORE
London - Docklands	CORE & MAN	CORE & MAN		CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN
London - West End	CORE & MAN	CORE & MAN		CORE & MAN				CORE & MAN	CORE
London - Westminster	CORE & MAN	CORE & MAN				CORE & MAN		CORE & MAN	CORE
London - Hammersmith	CORE & MAN	CORE & MAN				CORE & MAN		CORE & MAN	CORE
West London	CORE & MAN		CORE & MAN			CORE & MAN			CORE
Basingstoke	CORE	CORE & MAN		CORE & MAN					CORE
Bracknell	CORE & MAN			CORE & MAN	CORE & MAN				CORE
Bradford	CORE & MAN		CORE & MAN		CORE & MAN				CORE
Birmingham	CORE & MAN		CORE & MAN	CORE & MAN	CORE & MAN	CORE		CORE & MAN	CORE
Bristol	CORE & MAN		CORE & MAN	CORE & MAN	CORE & MAN	CORE	CORE & MAN		CORE
Cambridge	CORE & MAN	CORE & MAN				CORE			CORE
Chester	CORE	CORE & MAN					CORE & MAN		CORE
Derby	CORE & MAN	CORE & MAN			CORE & MAN				CORE
Edinburgh	CORE & MAN		CORE & MAN	CORE & MAN		CORE	CORE & MAN		CORE
Exeter	CORE				CORE & MAN				CORE
Farnborough	CORE				CORE & MAN				CORE
Glasgow	CORE & MAN	CORE & MAN		CORE & MAN		CORE	CORE & MAN		CORE
Guildford	CORE & MAN	CORE & MAN			CORE & MAN				CORE
Halifax	CORE		CORE & MAN		CORE & MAN				CORE
Huddersfield	CORE	CORE & MAN			CORE & MAN				CORE
Hull	CORE				CORE & MAN				CORE
Leeds	CORE & MAN	CORE & MAN		CORE & MAN	CORE & MAN	CORE	CORE & MAN	CORE & MAN	CORE
Leicester	CORE & MAN	CORE & MAN			CORE & MAN	CORE			CORE
Liverpool	CORE & MAN		CORE & MAN				CORE & MAN		CORE
Maidenhead	CORE				CORE & MAN				CORE
Manchester	CORE & MAN	CORE & MAN		CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN	CORE
Milton Keynes	CORE & MAN		CORE & MAN		CORE & MAN	CORE	CORE & MAN	CORE & MAN	CORE

193. Ibid

194. Ibid

Newbury	CORE						CORE
Newcastle	CORE & MAN	CORE & MAN					CORE
Nottingham	CORE & MAN	CORE & MAN	CORE & MAN				CORE
Plymouth	CORE			CORE & MAN			CORE
Reading	CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN	CORE	CORE & MAN	CORE
Sheffield	CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN	CORE		CORE
Slough	CORE & MAN	CORE & MAN	CORE & MAN	CORE & MAN			CORE
Swindon	CORE	CORE & MAN	CORE & MAN	CORE & MAN			CORE
Wakefield	CORE	CORE & MAN	CORE & MAN	CORE & MAN			CORE
Warrington	CORE	CORE & MAN				CORE & MAN	CORE
York	CORE	CORE & MAN		CORE & MAN		CORE & MAN	CORE
Other UK Towns	100+	60+	32+	50+	+	11+	132+
						+	+

Source: BT, On Relevant Product and Service Markets Within the Electronic Communications Sector Susceptible to Ex Ante Regulation In Accordance with Directive 2002/21/EC, July 2002, at 11 tbl. 3.

Note: CORE is backbone fiber service and MAN is metropolitan access network service.

In the forty geographic areas listed in Table 4, each market contains at least three alternative providers of backbone fiber service (core service) or both core service and metropolitan access network (MAN) service. With at least three companies *other than BT* owning network assets in major markets in the United Kingdom, it is reasonable to conclude that the wholesale business market is competitively supplied. Table 4 does include power companies, which are also well positioned to address the business sector.

5. Other Observations About the Process

The industry structure facing U.K. regulators was unique in the sense that competition from cable telephony emerged *before* mandatory local loop unbundling was ordered, let alone implemented. Cable operators have opposed mandatory unbundling on the grounds that it would not encourage facilities-based competitors to expand into rural areas. For example, Telewest stated in February 2000:

[W]e do not believe that local loop unbundling will deliver the necessary universal broadband upgrades that Government policies require. It may purely delay the dominant player from full broadband upgrade of its local infrastructure (assuming that ADSL over twisted copper pair is only an interim solution) and deter alternative local loop investors from further substantial build, particularly to the lower density areas.¹⁹⁵

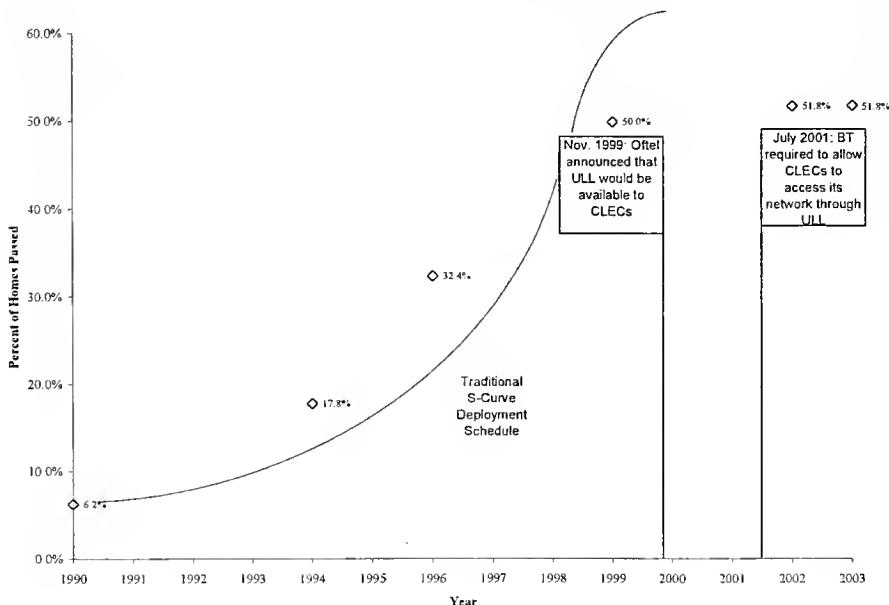
Telewest argued, correctly, that CLECs that rely on unbundled access were likely to focus their activities in densely populated markets.¹⁹⁶

195. Response of Telewest Communications, Towards a New Framework for Electronic Communications Infrastructure and Associated Services—The 1999 Communications Review, Feb. 2000, at §E ¶ 2.3 (available at <http://europa.eu.int/ISPO/infosoc/telecompolicy/review99/comments/telewest128b.htm>).

196. Ibid

Although the cable companies in the United Kingdom have begun to offer broadband Internet and voice service to their existing base of customers, only 50 percent of the homes in the United Kingdom were passed by the cable network as of July 2003.¹⁹⁷ This lack of coverage explains in part why cable television accounted for only 26.4 percent of the multichannel television market in the United Kingdom as of 2003.¹⁹⁸ Satellite television is much stronger in the United Kingdom than in the United States, as BskyB controls much of the sports content that cable operators cannot provide. It might be tempting for regulators to consider the cable industry's investment in broadband and telephony *in cables' existing footprint* as a sunk investment, which cannot be reversed through mandatory unbundling of BT's local loops. But mandatory unbundling of BT's network in rural areas might indirectly decrease the incentive of the cable operators to expand into rural areas, as UNE-based CLECs could enter those rural areas through unbundling *at a lower cost*. Cable operator Telewest succinctly explained the fallacy of the regulator's decision-making when it declared: '[I]f demand [for unbundled access] really exists, the market will deliver access products for new broadband services without regulatory intervention.'¹⁹⁹ Figure 6 shows the percent of homes passed by a cable operator in the United Kingdom between 1990 and 2003.

Figure 6: Percent of U.K. Homes Passed By Cable, 1990-2003



Source: Peter Humphreys, Radio and Television Systems in Great Britain, Spring 1999 (available at http://www.obs.coe.int/oea_publ/hbi/HBI2K_GB.html); Teldok, Teldok Yearbook 1997, 24 July 1997, at 245; Martyn Williams, TS News-UK Market Roundup, 4 December 1996; OFCOM, ITC Multi-Channel Quarterly-Q3 2002, 17 December 2002, at 7; OFCOM, ITC Multi-Channel Quarterly-Q2 2003, June 2003, at 7.

197. See ITC Multichannel Quarterly, above n 179.

198. Ibid

199. See Response of Telewest Communications, above n 195, at § E ¶ 2.5.

The deployment of any new technology typically follows an 'S-curve.' Initially, technology penetration increases at an increasing rate. After some critical point, the technology is deployed at a diminishing rate until the entire market is saturated. Until 1999, cable penetration in the United Kingdom followed a deployment schedule similar to that suggested by the S-curve. In particular, cable penetration rapidly increased from only 6.2 percent in 1990 to 50 percent by 1999. Since 1999, however, cable penetration has increased by only 1.8 percent. The slow deployment of cable services to new markets in the United Kingdom could be explained, in part, by the introduction of mandatory unbundling of BT's network. If this effect is present, consumers have been injured by the decrease in competition to BSkyB. Hence, Ofcom's policy has led to greater market power for a company that Ofcom recognizes is exercising market power.²⁰⁰

C. New Zealand

Deregulation of the telecommunications industry in New Zealand began in April 1989 with the separation of Telecom Corporation (Telecom) from New Zealand Post Office.²⁰¹ Telecom became fully privatized in 1990. In accordance with New Zealand's Commerce Act of 1986 and the Fair Trading Act of 1986, Telecom was declared 'dominant' in the telecommunications market. As a result, the regulator placed certain constraints on Telecom, but 'reaffirmed its reliance on general competition law to achieve its objective in telecommunications.'²⁰² In 1995, in an appeal of an access-pricing dispute styled as a violation of the Commerce Act, the Judicial Committee of the Privy Council of the House of Lords embraced the efficient component-pricing rule, which implies that an incumbent (Telecom) may charge an entrant (Clear Communications) the incumbent's opportunity cost of granting access, as a principle consistent with New Zealand antitrust law.²⁰³

Unlike many other countries, New Zealand did not adopt any sector-specific regulation.²⁰⁴ Section 64 of the Telecommunications Act of 2001 required the Commerce Commission (CC) to determine the necessity of regulating access to the unbundled elements of Telecom's local loop network and fixed public data network.²⁰⁵ The CC initially set resale discounts as specified in the Telecom Act of 2001. In December 2003, the CC recommended in its *Final Report* against unbundling local loops, line sharing, and unbundling 'elements of Telecom's fixed Public Data Network beyond those supporting the Asymmetric Digital Subscriber Line (ADSL) bitstream services.'²⁰⁶

200. See, e.g., Ofcom, The Regulation of Electronic Programme Guides, March 2003, at ¶ 16 (available at http://www.ofcom.org.uk/consultations/past/epg/stat_provisions/?a=87101); Ofstel, Beyond the Telephone, the Television and the PC, Aug. 1995, at ¶ 4.4.12, (available at http://www.ofcom.org.uk/static/archive/ofstel/publications/1995_98/info_super/multi.htm).

201. New Zealand Telecommunications 1987-2001, Publication No. 8, ¶¶ 8-9 (August 2001) [hereinafter *New Zealand Pub. No. 8*].

202. Ibid, at ¶ 24

203. For an economic assessment of this decision, see William J. Baumol/J. Gregory Sidak, 'The Pricing of Inputs Sold to Competitors: Rejoinder and Epilogue', 12 Yale J. Reg. 176 (1995).

204. See, e.g., Geradin & Kerf, above n 141, at 119 (explaining how the New Zealand adopted the opposite approach of the United States, where sector-specific regulation was pervasive).

205. Telecommunications Act 2001 Section 64 Review and Schedule 3 Investigation into Unbundling the Local Loop Network and the Fixed Public Data Network, Final Report, 9 December 2003, at i [hereinafter CC *Final Report*].

206. Ibid, at i, ii

To measure the efficacy of full local loop unbundling, the CC used a cost-benefit analysis that measured the changes in total surplus (consumer and producer surplus) relative to the status quo of no regulation.²⁰⁷ To the extent that mandatory unbundling reduces prices in the short term, consumer welfare increases. The increase in consumer welfare due to an expansion in output is referred to as an “allocative efficiency” gain. The CC also considered the “wealth transfer” from producers to consumers when prices decline, which occurs independent of output expansion. Although the CC found short run gains in welfare, the calculations were subject to considerable uncertainty and criticism, and did not take account of effects on investment by the incumbent. Although it recognized the potential importance of dynamic efficiency, the CC believed that there was no robust method of quantifying dynamic efficiency gains that were applicable to its decision.²⁰⁸

The CC ultimately rejected full local loop unbundling and listed several reasons in support of its decision. First, the CC noted that platform competition, especially in the form of fixed wireless networks, was likely to ‘evolve and reduce the extent of [Telecom’s] bottleneck over time.’²⁰⁹ Second, the CC explained that the potential for dynamic efficiency gains from local loop unbundling was tempered by international experience, noting that ‘in a significant number of countries, the gains from local loop unbundling have been disappointing.’²¹⁰ Third, the CC revealed that responses to its draft report indicated ‘fairly limited demand for local loops’ as the preferred means of competitive entry.²¹¹ Fourth, the CC explained that mandatory unbundling was ‘a resource intensive activity,’ which generated ‘a significant level of controversy in determining terms of access to unbundled loops in overseas jurisdictions.’²¹² Most importantly, the CC determined the economic incentives for the incumbent to invest in new services would be significantly decreased and that these new services could lead to very large welfare gains to consumers.

In lieu of mandatory unbundling, the CC ‘recommended’ access to Telecom’s ADSL service for residential and small and medium size enterprises (SMEs), along with the associated backhaul transmission services²¹³ and operational support systems (OSSs).²¹⁴ With the exception of updating the ‘Kiwi Share,’ which imposes universal service obligations on Telecom and establishes a price ceiling for its residential calls,²¹⁵ the result of the CC’s recommendations was a largely unregulated telecommunications market relative to most European countries and the United States.

207. Ibid, at 153 ¶¶ 622-26

208. Ibid, at 169 ¶ 695

209. Ibid, at 196 ¶ 788

210. Ibid, at 197 ¶ 792

211. Ibid, at 197 ¶ 793

212. Ibid, at 197 ¶ 794

213. Ibid, at ii

214. Ibid, at iii

215. Government Announces Updated Kiwi Share Obligation (available at <http://www.med.govt.nz/pbt/telecom/minister20011218b.html>); Determination for TSO Instrument for Local Residential Service for period between 20 December 2001 and 30 June 2002 at 11 (available at <http://www.comcom.govt.nz/telecommunications/obligations/FinalDetermination17Dec2002.PDF>).

Among other requirements, Telecom is required to provide (1) a monthly line rental no higher than the CPI adjusted price of the residential line rental charged at 1 November 1989 and (2) free local calling.

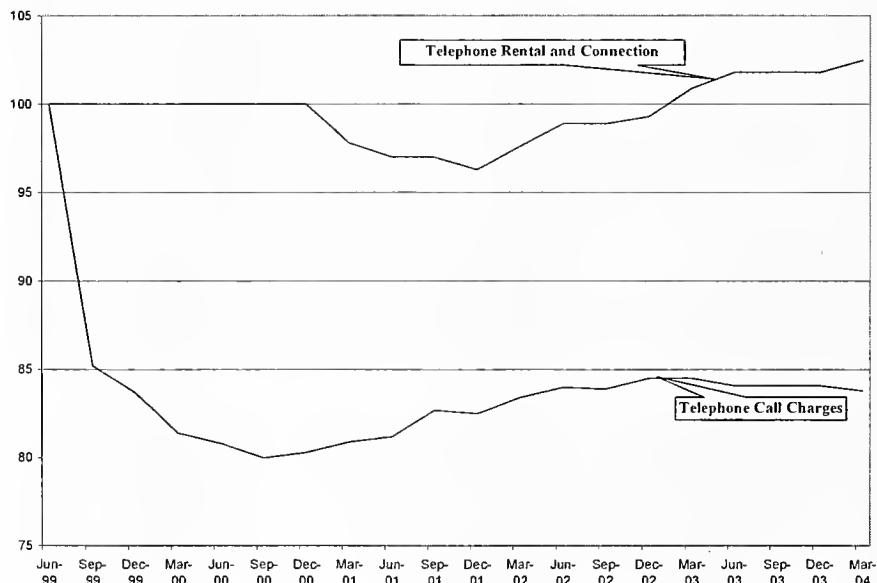
1. Retail Competition

In this section, we examine the recent trends in investment and pricing in New Zealand. The New Zealand survey provides a potential counterfactual to the unbundling experience in other countries in our report.

a. Pricing

Despite the fact that the CC has abstained from mandatory unbundling, prices for telecommunications services in New Zealand have not increased substantially. Figure 7 shows the prices for telephone rental and connection and telephone call charges in New Zealand since June 1999.

Figure 7: Statistics New Zealand's Real Residential Telephone Service Price Index: Percent Change from June 1999 Index



Source: Statistics New Zealand (available by request at <http://www.stats.govt.nz/>).

As Figure 7 shows, telephone rental and connection charges offered by all carriers in New Zealand consistently decreased from June 1999 to December 2001. From March 2003 through March 2004, telephone rental and connection charges have increased by a modest 2.5 percent. Similarly, the price for telephone call charges has remained flat over the past few years. According to Statistics New Zealand, prices for residential telephone service decreased by an average of 3.5 percent per year between 1991 and 2001.²¹⁶ One possible explanation for the decline in prices in the absence of mandatory unbundling is that TelstraClear and other facilities-based rivals compete with Telecom in urban areas.²¹⁷

216. See New Zealand Pub. No. 8, above n 201, at 22-23.

217. TelstraClear's network was established before TelstraSaturn bought Clear Communications in 2001. TelstraSaturn and Clear separately invested in fiber optic networks in New Zealand. See, e.g., Country Profile: New Zealand, Hot Telecom, March 2004, at 14 (available at <http://www.hottelecom.com/new-zealand.html>) [hereinafter *New Zealand Profile*].

b. Investment

As of June 2003, Telecom had decreased its capital expenditure by over 60 percent since 2001.²¹⁸ The decline in Telecom's investment may be attributable to the rapid decline in telecommunications prices and the general decline of the global telecommunications market. The decline in Telecom's *rate* of investment is potentially misleading, however, because Telecom increased its investment in the late 1990s. In particular, Telecom introduced high-speed Internet access in 1999 with the roll out of Jetstream, which is based on ADSL technology.²¹⁹ In 2000, following the development of Jetstream, Telecom connected New Zealand's North and South Islands using a submarine cable, with an estimated investment of NZ\$38 million. The submarine cable allows 98 percent of New Zealand's population to access Telecom's wireless network.²²⁰ Telecom also introduced voice over Internet protocol (VoIP) in 2000.²²¹ Telecom offers VoIP to business customers, which is a fully managed service that includes extensive IP services and is the base for their next generation network (NGN), which is currently being developed and will gradually be rolled out over the next ten years.²²² Telecom's NGN is comprised of 'a single network that delivers multiple applications (voice, data, video) to multiple devices, whether fixed or mobile.'²²³ In addition to the development of the NGN, Telecom plans to roll out its 3G wireless services in the next few years, after paying a concession fee of US\$16.94 million in January 2001.²²⁴

Perhaps more importantly, Telecom is rolling out video services over ADSL, which will lead to large benefits to New Zealand consumers.²²⁵ Fearing Telecom would slow its investment in video capabilities, the CC gave TelstraClear low grade (128K) bitstream in lieu of full loop unbundling. The main competition for Telecom's video service is satellite television, as cable television penetration in New Zealand is lacking (except in Wellington). Soon, Telecom will have the 'triple play' of voice, broadband, and television over a single network. It is noteworthy that New Zealand is in the forefront of video over the fixed-access network while the United States, which imposes more severe unbundling requirement on its fixed-access providers, lags behind.

218. Telecom New Zealand Annual Report for the Year Ended 30 June 2003, at 4 (available at http://www.telecom.co.nz/binaries/annual_report_2003.pdf)

219. TelstraClear Company Information (available at <http://www.telecom.co.nz/content/0,3900,200633-1548,00.html>) [hereinafter *TelstraClear Information*]

220. *Ibid*

221. NetIQ Case Study, *Telecom New Zealand Prepares for IP Telephony with NetIQ's Vivinet Manager*, 2003 (available at <http://www.netiq.com/products/vm/whitepapers.asp>).

222. See Telecom New Zealand's website (<http://www.telecom.co.nz/content/0,3900,202900-201383,00.html>); TelstraClear, *Telecom NZ Next Generation Network Regulatory Issues raised by NGN Deployment*, Conference on Commerce Commission Draft Report 10-14 November 2003, at 5 (available at <http://www.comcom.govt.nz/telecommunications/l1u/Conf/tclngn.PDF>)

223. Murray Milner/Vince Pizzica, 'Telecom New Zealand: Pragmatic Evolution to Next Generation Networks', Alcatel, 22 April 2003.

224. See New Zealand Profile, above note 217, at 21.

225. See Jerry Hausman, Analysis of OXERA Cost Benefit Analysis (Conference Presentation), 11 November 2003, at 5.

2. Entry Barriers

As of early 2004, facilities-based competition was well underway in New Zealand. TelstraClear represents the most significant facilities-based competitor to Telecom. TelstraClear invested over \$1 billion in New Zealand through 2002, with an additional investment of approximately \$200 million in 2003.²²⁶ By June 2002, TelstraClear had acquired a 7 percent share of all fixed-access voice connections.²²⁷ TelstraClear, which owns Clear Net and Paradise.net, and other entrants had acquired 28 percent of the residential broadband market by June 2003.²²⁸

Before the purchase of Clear Communications by TelstraSaturn and Austar in December 2001 (which formed TelstraClear), both Clear and TelstraSaturn independently invested millions of dollars to establish their own fiber-optic networks.²²⁹ Since the acquisition, TelstraClear has been developing a nationwide network in New Zealand to provide telephone, data, Internet, mobile, and cable television services.²³⁰ TelstraClear plans to spend NZ\$14 million to roll out its network in nine cities.²³¹ In January 2002, TelstraClear proposed the construction of an overhead network with underground connections in Auckland, which will provide direct competition to Telecom's network.²³² During the Section 64 Review proceeding in 2003, TelstraClear claimed that it had determined not to continue rolling out its network because it was too expensive.²³³ Such claims seem implausible in light of the fact that Telstra is the largest Australian company and paid its shareholders an interim dividend of A\$1.6 billion in April 2004.²³⁴ Thus, our hypothesis that mandatory unbundling undermines the incentive of CLECs to invest in their own facilities seems to hold.

Another significant facilities-based rival in New Zealand is Countries Power, which rolled out a fibre optic and radio network on May 8, 2003.²³⁵ The project, called Wired Country, provides high speed Internet and telephone services to business and residential customers in the Franklin and Papakura regions of New Zealand.²³⁶

Fixed wireless access (FWA) providers represent yet another source of facilities-based competition. In its decision not to require unbundling, the CC noted the potential for fixed wireless to constrain Telecom's local telephone prices:

226. New Zealand Commerce Commission, *4th Annual New Zealand Telecommunications & ICT Summit*, 25 June 2003, at 2-3. [hereinafter *4th Summit*]

227. See New Zealand Profile, above n 217, at 27.

228. Ibid, at 19

229. See 4th Summit, above n 226, at 14.

230. See TelstraClear Information, above n 219.

231. See New Zealand Profile, above n 217, at 19.

232. *TelstraClear Application: Area 3 Rollout Assessment of Environmental Effects*, Jan. 2002, at 3 (available at http://www.telstraclear.co.nz/network_proposal.pdf).

233. See New Zealand Profile, above n 217, at 14 ('Over a year ago [TelstraClear] basically abandoned the roll out of any new fixed infrastructure themselves and their future now depends on utilising TNZ's national network wherever it can.').

234. Telstra Press Release, *Telstra pays shareholders interim dividend of \$1.6 billion*, 29 April 2004 (available at http://www.telstra.com.au/communications/shareholder/docs/tls225_interindividend.pdf). Telstra has announced a total expected payout of over A\$4 billion over the next few years.

235. See 4th Summit, above note 226, at 2-3.

236. *Counties Power Gets Totally Wired*, Axon, October 2003 (available at <http://www.axon.co.nz/info/Counties%20Power%20gets%20totally%20wired.htm>)

The Commission notes the potential for Fixed Wireless Access (FWA) to evolve and reduce the extent of this bottleneck over time, although the Commission has reservations over the technical capacity of FWA to be a substitute for services that can run over the local loop network. FWA is likely to evolve over time in terms of its capacity and its ability to substitute for services that run over the local loop network, although the timing and nature of this evolution is uncertain.²³⁷

The CC's inclusion of fixed wireless in the relevant product market is notably at odds with the position of the U.S. FCC, which has argued that FWA is not a suitable substitute for the fixed copper network.²³⁸

Beginning in 1999, Woosh Wireless (formerly Walker Wireless) began rolling out a national FWA network to compete with Telecom's fixed-access network.²³⁹ Woosh competes with Telecom in voice and data services by targeting residential and business customers.²⁴⁰ As of May 2004, deployment of Woosh's network was underway in Auckland and Southland, and was expected to continue in Wairarapa, Northland, Canterbury, and other major markets in late 2004.²⁴¹ In addition to Woosh, other FWA providers, such as Broadcast Communications Limited (BCL), are investing in FWA technology intended to compete with Telecom. For example, BCL is rolling out a FWA network that covers rural and provincial areas in New Zealand.²⁴²

Telecom regards Woosh and other FWA providers as competitors in the local telephone services market. According to a Telecom study, if Woosh were able to capture 10 percent of the local market covered by its roll-out, then Woosh would be able to undercut Telecom's prices by 22 percent.²⁴³ As Woosh and other CLECs increase their market share, they will be able to exert further pricing pressure on Telecom.²⁴⁴

Facilities-based entrants argue that mandatory unbundling would hinder the introduction and development of new technologies that compete with Telecom's local loops.²⁴⁵ In particular, those CLECs explain that mandatory unbundling will make raising investment capital increasingly difficult. They also point out that mandatory unbundling would reduce the price at which competitive fixed-line services could be offered, thereby undermining the return on their investment. According to some economists, New Zealand likely experienced more facilities-based competition than the United States due to its 'light-handed' approach to telecommunications regulation.²⁴⁶

237. See CC Final Report, above n 205, at 196 ¶ 788.

238. See Triennial Review, above n 8, at 141 ¶ 231 ('In addition, recent financial difficulties of fixed wireless carriers suggest the potential to use such services as substitutes for local loops used to serve the mass market is limited, at least for the short term.').

239. See CC Final Report, above n 205, at 91 ¶¶ 368-370.

240. Ibid, at 94, ¶ 385.

241. Whoosh Wireless, About Us, (available at <http://www.woosh.com/UserInterface/Woosh/Static/WhoisWoosh/WhoisWoosh.aspx>).

242. See CC Final Report, above n 205, at 95, ¶ 392.

243. Telecom's Response to the Commission's Draft Report, 29 October 2003, at 55.

244. See CC Final Report, above n 205, at 96, ¶ 399.

245. Ibid, at 167, ¶ 688 and 174, ¶ 710

246. See, e.g., James R. Green/David J. Teece, 'Four Approaches to Telecommunications Deregulation and Competition: The U.S., U.K., Australia, and New Zealand', U.C. Berkeley Working Paper, Feb. 1999, at 21.

3. Stepping Stone Hypothesis

The stepping-stone hypothesis implies that after initial entry into the market through the use of a competitor's lines, CLECs will eventually invest in construction of their own network. The OECD and other analysts are in favor of mandatory unbundling in New Zealand.²⁴⁷ Despite these views, in May 2004 the New Zealand government accepted the CC's recommendation on mandatory unbundling.²⁴⁸ Hence, the stepping stone hypothesis was never put to the test in New Zealand.

4. Wholesale Competition

We are not aware of any evidence that facilities-based entrants are providing wholesale access to new entrants in New Zealand. As of December 2003, the CC characterized the wholesale markets for local loops, bitstream access, fixed public data network (PDN) services, and backhaul services as 'limited,' with the exception of wholesale competition in Auckland Central, Mt. Wellington, Manukau City, Courtenay Place, and Wellington Exchange Serving Areas.²⁴⁹ Given the nature of the supply of and demand for switching, transport, and high-capacity loops serving business customers, however, we expect that the development of a wholesale market in New Zealand should be no different from the U.S. experience.

5. Other Observations about the Process

New Zealand is unique among the countries profiled in this report in that the CC used the appropriate social-welfare framework—namely, the sum of consumer and producer surplus—to assess various regulatory policies. Most regulators, including the U.S. FCC, have embraced a competitor-welfare framework when formulating telecommunications policy. Perhaps more remarkable, the CC considered dynamic efficiency in addition to static efficiency when evaluating alternatives, and defined the former as 'how well the competitive process works: how well the market ultimately responds to the demands of end-users over time, by changes to what is produced and how it is produced.'²⁵⁰ The CC concluded that (negative) dynamic efficiency effects of unbundling could potentially exceed (positive) static effects:

The general point, though, is that regulation imposes risks on investors and can potentially hamper investment and, as a consequence, innovation. Regulation may mean that firms with access to Telecom's local loop network or fixed PDN may have access to the benefits of an upgraded network without taking associated risks, which are borne by the owner of the network. Regulated firms may be reluctant to invest when competing firms have access to some of the rents provided by their assets. A risk for the regulated firm is that entrants may

247. See, e.g., OECD, *Broadband and Telephony Services Over Cable Television Networks*, 7 November 2003, at 44; Paul Budde, *New Zealand—Analysis—Market Overview, 1998-2002*.

248. Honorable Paul Swain, Decision on Telecom Network Recommendations, 19 May 2004 (available at <http://www.beehive.govt.nz/ViewDocument.cfm?DocumentID=19750>) (explaining that his decision 'decision that has the potential to quickly promote more competition in the long term interests of consumers.').

249. See CC Final Report, above n 205, at 434.

250. *Ibid.*, at 166 ¶ 684

‘cherry pick’ markets, without committing to the market in the same way as the incumbent has. The importance of these possibilities would depend on the extent of unbundling and the behaviour of access-seekers.²⁵¹

As other countries are considering whether to mandate unbundling, the CC’s framework for analysis provides a different point of view in that it was more explicitly economic in focus.

D. Canada

The Canadian Radio-Television and Telecommunications Commission (CRTC) regulates telecommunications providers in Canada. The Telecommunications Act of 1993 extended the regulatory authority of the CRTC over all telecommunications services in Canada.²⁵² The powers given to the CRTC by the Act include the ability to set ‘just and reasonable’ access rates and prevent discrimination by Canadian carriers in providing telecommunications services.²⁵³ The CRTC also has the ability to forbear from regulation if users are sufficiently protected by competition.²⁵⁴ The CRTC has attempted to ensure entrants’ prospects for success by mandating number portability, unbundled local loops, co-location, interconnection, and implementing other regulatory safeguards.²⁵⁵

In May 1997, the CRTC effectively opened Canada’s entire telecommunications market to competition.²⁵⁶ In Decision 97-8, the CRTC established unbundling rules, including price ceilings on prices that ILECs may charge CLECs for facilities, price floors on prices that ILECs may charge for business local exchange services, and the establishment of mandatory unbundling of local loops.²⁵⁷ The CRTC provided the following rationale for mandatory unbundling:

[T]he Commission concluded that the unbundling of telephone company networks into discrete components would enable competitors to mix their own facilities with those of the telephone company in the most efficient manner, and thus stimulate the development of competition in telecommunications. The Commission also concluded that unbundling should extend beyond monopoly

251. *Ibid.* at 176 ¶ 719

252. For a review of Canada’s telecommunication industry, regulation, and competitive framework in the 1990s, see *Who Pays for Universal Service*, above n 41.

253. CRTC, Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets—Deployment/Accessibility of Advanced Telecommunications Infrastructure and Services 6 (2003) [hereinafter *2003 Report to the Governor*].

254. See, e.g., Steven Globerman, ‘Deregulation of Telecommunications: An Assessment, in *Breaking the Shackles: Deregulating Canadian Industry 87*’ (Walter Block and George Lerner eds., 1991).

255. OECD, *Regulatory Reform in Canada: From Transition to New Regulation Challenges, Regulatory Reform in the Telecommunications Industry 15* (2002) [hereinafter *OECD Reform in Canada*].

256. See, e.g., William T. Stanbury, ‘Chronology of Events Related to the Canadian Telecommunications Industry: January 1992 to March 1995’, in *The Future of Telecommunications Policy in Canada* 489 (Steven Globerman, William T. Stanbury & Thomas A. Wilson eds., 1995) (reviewing the industry structure facing Canadian regulators in the early 1990s).

257. CRTC, *Telecom Decision CRTC 97-8*, 1 May 1997 [hereinafter *CRTC Decision 97-8*].

controlled bottleneck (i.e. essential) services to services that are subject to dominant supply by the telephone companies.²⁵⁸

Hence, the CRTC believed that mandatory unbundling would ‘stimulate’ competition in telecommunications. In accordance with CRTC Decision 94-19, Decision 97-8 concluded that competition in telecommunications would not be possible without mandatory unbundling.²⁵⁹

It bears emphasis that the CRTC implemented mandatory unbundling in 1997 with a much narrower scope than the FCC did in 1996.²⁶⁰ The CRTC unbundled local loops only in certain areas where ‘it may not be economically or technically feasible for competitors to provide local loops’.²⁶¹ Moreover, the Commission determined that local switching was not an essential facility²⁶² because switching equipment was readily available from third parties and many CLECs already possessed switching functionality.²⁶³ Although it did mandate resale for certain services,²⁶⁴ the CRTC did not create a platform of unbundled elements that included loops, transport, and switching. With respect to the pricing of unbundled loops, the CRTC considered submissions arguing for TSLRIC and TELRIC pricing models, but it concluded that rates for unbundled local loops should be based on Total Utility Segment Phase II costs—a measure of future-looking incremental costs associated with the provision of services exclusive of joint or common costs—plus a 25 percent mark up.²⁶⁵

Moreover, the CRTC planned to rescind mandatory unbundling on ILECs after a five-year period to ‘permit entry at a pace that will better serve the public interest and, at the same time, provide incentives to CLECs to undertake construction or acquisition of facilities’.²⁶⁶ Before the five-year period expired, however, the CRTC extended mandatory unbundling indefinitely because it believed that competition would not ‘evolve sufficiently prior to the end of the sunset period’.²⁶⁷ The CRTC believed ‘that it would be appropriate to extend the sunset period without specifying a particular termination date’ because of the difficulty in

258. Ibid, at ¶ 66.

259. Ibid, See also Steven Globerman/Hudson N. Janisch/William T. Stanbury, Analysis of Telecom Decision 94-19, Review of Regulatory Framework, in *The Future of Telecommunications Policy in Canada*, above note 256, at 417.

260. For a detailed description of the differences between the regulatory decisions of the CRTC and the FCC, see Robert W. Crandall/Leonard Waverman, *Talk Is Cheap—The Promise of Regulatory Reform in North American Telecommunications* (Washington, DC: Brookings Institution 1995) 56-63.

261. See CRTC Decision 97-8, above n 257, at ¶ 82.

262. It bears emphasis that the FCC rejected the essential facilities doctrine as a basis for mandatory unbundling. The agency argued that the structure of the Telecommunications Act requires the FCC to formulate a rule for two separate standards: the ‘necessary’ standard and the ‘impairment’ standard. The FCC concluded that employing the essential facilities doctrine would collapse the separation of those standards because the essential facilities doctrine would inform the ‘necessary’ standard only. See Triennial Review, above n 8, at ¶¶ 107-08.

263. See CRTC Decision 97-8, above n 257, at ¶ 93.

264. Ibid, at ¶ 237. The CRTC mandated the ‘unrestricted resale by CLECs of unbundled components, other than subscriber listings’ and ‘the resale of residential exchange services to provide residential services’ with number portability. Ibid, at ¶ 240, 257.

265. Ibid, at ¶ 124-126; The Phase II costing methodology ‘has always been intended to capture and reflect all prospective economic costs associated with a service or activity.’ NorthernTel, Response to NorthernTel, Limited Partnership Tariff Notice No. 197, 27 April 2004 (available at <http://www.crtc.gc.ca/8740/eng/2003/n51/197/040427.doc>).

266. Ibid, at ¶ 86.

267. CRTC, Telecom Order 2001-184, 1 March 2001, at ¶ 28.

determining the appropriate sunset date.²⁶⁸ The Commission did not specify specific geographic markets where unbundling would continue.²⁶⁹

1. Retail Competition

With the unbundling rules in place, CLECs began offering local services through unbundled local loops in Canada in 1998. The CRTC updates its annual report of telecommunications competition in November of each year. Because the most recent report was published in November 2003, the data presented in this survey describe the state of competition as of December 2002. As of that date, CLECs controlled 3.9 percent of total local access lines in Canada.²⁷⁰ CLECs increased their share of local access lines in the business sector from 1.8 percent in 1998 to 8.6 percent in 2002, but their share in residential lines reached only 1.4 percent by 2002.²⁷¹

a. Pricing

The OECD's 2002 Review of Regulatory Reform in Canada found that 'low prices, good quality service and relatively rapid diffusion of new technologies characterize the Canadian telecommunications landscape.'²⁷² As of 2002, the average prices for business and residential telecommunications services, in terms of U.S. dollars calculated on a purchasing power parity basis, were lower than the corresponding averages in the United States and OECD.²⁷³

It is possible to compare the Canadian CPI and an index of the price faced by the average household for a basket of telephone services. The basket of telephone services is a weighted average of consumer expenditures on basic local service, other local services (such as enhanced features), long distance, installation, and repair charges, but it excludes expenditures on Internet and cellular services.²⁷⁴ The increase in the telephone index relative to the CPI from 1996 to 1998 is partially due to CRTC-approved rate increases designed to align the price of local telephony with the associated costs.²⁷⁵ The CRTC's price cap on existing telephone companies took effect in 1999 and was tied to the rate of inflation less a 4.5 percent productivity factor.²⁷⁶

Since 1999, the price of telephone service has increased at a faster rate than the general rate of inflation. Absent any competitive effects, local telephone prices would be exactly 4.5 percent below the CPI. For example, if the general rate of inflation were 3 percent, and if there were no competitive effects, then local telephone service prices would decline by 1.5 percent (equal to 3 percent less 4.5 percent). Because the spread between the CPI and the telephone index narrowed since the price cap was put into effect, it appears that mandatory unbundling is not

268. Ibid

269. Ibid

270. See 2003 Report to the Governor, above n 253, at 44 (tbls. 4.15, 45 tbl. 4.17).

271. Ibid, at 44 tbl. 4.15, 45 tbl. 4.17

272. See OECD Reform in Canada, above n 255, at 17.

273. Ibid, at 40 fig. 1

274. Statistics Canada Catalogue No. 60-010XPB 1995-98; 62-001XPB 1999-2001; 62-001, 2002.

275. CRTC, *Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets*, Nov. 2003, at 112 (fig. 6.1).

276. See 2003 Report to the Governor, above n 253, at 112-113.

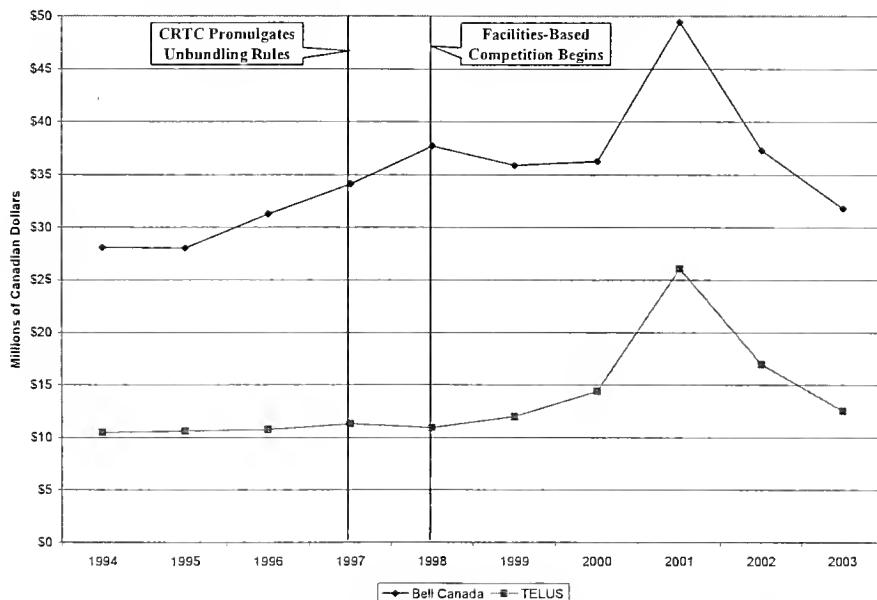
having the desired effect of lowering the retail price of telephone service in Canada.

b. Investment

According to the CRTC, mandatory unbundling was intended to stimulate investment by both ILECs and CLECs.²⁷⁷ From 1998 to 2001, CLECs' capital expenditure was lower in absolute value than that for ILECs, but the capital expenditure per revenue dollar for CLECs was 20 to 30 percent higher than for ILECs during the same period.²⁷⁸ This result is expected because CLECs were just getting started, and with 'lumpy investment' CLECs had to invest more per dollar of revenue. Because the sizes of ILECs and new entrants differ significantly, it is easier to compare capital investment among ILECs and CLECs when the investments are scaled by revenues. The CLECs' high ratio of capital expenditure to revenue suggests that, from 1998 through 2001, CLECs invested more aggressively than ILECs per dollar.²⁷⁹ In 2002, however, CLECs' capital expenditure per revenue dollar decreased by 20 percent (below the ILECs' comparable ratio), as demand for all services declined.

While CLEC investment per revenue dollar decreased, ILEC capital expenditure per revenue dollar remained relatively stable over this time period.²⁸⁰ Figure 8 shows ILEC investment from 1994 through 2003. All dollar figures included in this survey are stated in Canadian dollars unless otherwise specified.

Figure 8: ILEC Capital Expenditures 1994-2003



Sources: Bell Canada Annual Reports 1999-2003 and TELUS Annual Reports 1998-2003.

277. See CRTC Decision 97-8, above n 257, at ¶ 11, 73, 86, 124, 237.

278. See 2003 Report to the Governor, above n 253, at 19 fig. 4.5, 20 fig. 4.6.

279. CRTC, *Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets*, Nov. 2003, at 20 (fig. 4.6).

280. *Ibid.* at 19 fig. 4.5

As Figure 8 shows, in the four years following the CRTC's mandatory unbundling decision in 1997, the two major ILECs in Canada—Bell Canada and TELUS—increased investment substantially. However, capital expenditures decreased from 2001 through 2003. One could cite the increase in ILEC investment immediately following the CRTC unbundling decision as evidence that mandatory unbundling, by lowering entry barriers, stimulates ILEC investment in new (unregulated) sectors. It is possible, however, that the increase in ILEC investment was attributable to other forces, such as the emergence of facilities-based competition in 1998 or the general level of domestic output. Without a more elaborate econometric analysis, it is impossible to distinguish between these two hypotheses.

By early 2004, ILEC investment appeared to be recovering. In March 2004, Bell Canada announced that it had added bandwidth to its local link to provide video over its high-speed Internet service.²⁸¹ Bell Canada also developed a VoIP service to be tested in 2004.²⁸² In 2003, TELUS launched its next generation network, which integrates voice, data, and video applications.²⁸³

Other regional ILECs also began large scale investment projects in 2003. For example, Aliant Telecom, which serves Atlantic Canada, expanded its network to cover 65 percent of Atlantic Canadian homes in 2003.²⁸⁴ Aliant is also developing its IP network, including VoIP, with a planned investment of over \$40 million in the next five years.²⁸⁵ Since 1987, SaskTel has invested more than \$2 billion in its network.²⁸⁶ In 2003, SaskTel was able to deploy high-speed Internet access to a higher percentage of rural homes than any other Canadian provider, reaching over 75 percent of Saskatchewan residents.²⁸⁷

2. Entry Barriers

Residential customers in Canada enjoy robust platform competition between wireline, cable, and wireless technologies. EastLink pioneered the Canadian cable telephony business in 1999 and, as of May 2004, had established a customer base of approximately 235,000 households throughout Nova Scotia, Prince Edward Island, and New Brunswick.²⁸⁸ As of May 2004, EastLink offered its residential customers a bundle of cable television, high-speed Internet access, and local telephone service for a flat fee of \$104.95 per month.²⁸⁹ Cable companies Cogeco Cable Inc., Rogers Communications (Rogers), and Shaw Communications plan to offer cable telephony in 2005.²⁹⁰ Through Rogers Telecom, Rogers expects to offer

281. Bell Canada Enterprises, 2003 Annual Report, at 16, 22-23 (released 10 March 2004) (available at <http://www.bce.ca/en/>).

282. Ibid

283. TELUS Corp., 2003 Annual Report, at 5 (released 2 March 2004) (available at <http://about.telus.com/investors/index.html>). [hereinafter *TELUS Annual Report*]

284. Aliant Inc., Annual Report 2003, at 2 (released 5 March 2004) (available at <http://www.aliant.ca/english/ir/index.shtml>).

285. Ibid

286. Saskatchewan Telecommunications Holding Corp., 2003 Annual Report, at 2-3. (released 31 March 2004) (available at <http://www.sasktel.com/>). [hereinafter *SaskTel Annual Report*]

287. Ibid

288. EastLink, Our History (available at <http://www.eastlink.ca/about/index.html>).

289. EastLink, Residential Bundles (available at <http://www.eastlink.ca/specials/residentialbundles/index.html>).

290. Barbara Shecter/Mark Evans, *National Post*, 25 August 2003, *I

digital telephone service to roughly 1.8 million households by mid-2005.²⁹¹ Rogers AT&T Wireless, Rogers' partially-owned wireless subsidiary, is one of Canada's largest cellular providers, serving roughly 3.8 million customers in a service area that covers 93 percent of Canada's population.²⁹² Through its expected rollout of cable telephony, Rogers will be able to combine wireless services with local telephony, cable television, and data access. As of 2004, such a combination was not possible for U.S. cable companies, which lacked wireless facilities. Cable facilities were available to roughly 10.5 million (approximately 91 percent) Canadian households in 2003.²⁹³ Canada's high cable penetration provides a solid base for the continued deployment of cable telephony and cable modem service.

Platform competition for residential customers is emerging from non-cable carriers as well. For example, Canadian telecommunications consumers demonstrate an increasing willingness to substitute wireless service for not only secondary, but also primary lines.²⁹⁴ There has even been some competition from utility companies that offer telephony services over their existing infrastructure.²⁹⁵

Competition in Canadian data services is sufficiently intense that the CRTC has chosen to forbear from regulating them. Platform competition between companies offering cable modem service and DSL service has fostered growth in the residential broadband market, with 85 percent of Canadians living in communities in which high-speed broadband service is available.²⁹⁶ Cable modem service was first offered in 1997 and, as of year-end 2002, approximately 85 percent of homes passed by cable had access to cable modem service.²⁹⁷ As of September 2003, over 2 million homes (equal to 18.1 percent of total homes passed by cable) were cable modem subscribers.²⁹⁸ Figure 9 shows the shares for the residential broadband market in Canada by access technology.

291. Rogers Communications Inc., 2003 Annual Report, at 14 (released April 2004) (available at http://media.corporate-ir.net/media_files/TOR/RCI.B.TO/reports/rci03ar.pdf)

292. *Rogers Wireless Communications Inc.*, Hoover's Company Basic Records, 12 March 2004 (available at <http://www.hoovers.com>). AT&T's presence is likely to increase after Rogers' acquisition of Microcell, which owned the well-known Fido brand in September 2004. See *Rogers Wireless Makes \$1.4 Billion Takeover Offer for Fido's Microcell*, TechNewsWorld, 20 September 2004 (available at <http://www.technewsworld.com/story/36761.html>).

293. See OECD Reform in Canada, above n 255, at 22; CRTC Financial and Statistical Summaries for Broadcasting (available at <http://www.crtc.gc.ca/eng/stats.htm>); and 2001 Census of Canada (available at <http://www12.statcan.ca/english/census01/home/index.cfm>)

294. CRTC, Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets—Deployment/Accessibility of Advanced Telecommunications Infrastructure and Services, 97 (2002) [hereinafter 2002 Report to the Governor].

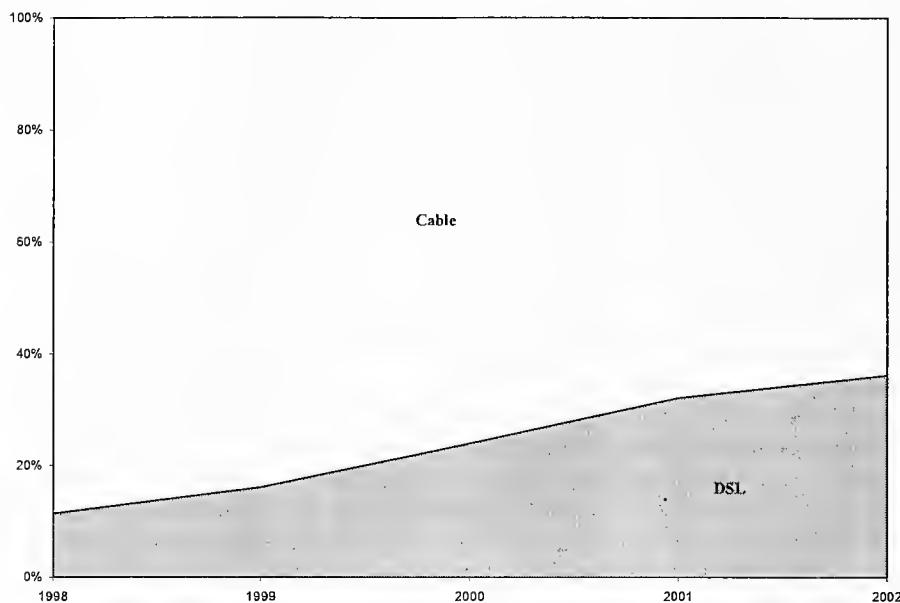
295. *Ibid.*, at 38

296. See 2003 Report to the Governor, above n 253, at ii.

297. See 2002 Report to the Governor, above n 294, at Appendix 2, 15.

298. Canadian Cable Television Association, Annual Report 2002/2003, at 3 (available at <http://www.ccta.ca/english/publications/annual-reports/2003/index.htm>)

Figure 9: Residential Broadband Market Shares, 1998-2002



Source: CRTC, *Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets*, Nov. 2003, at 57 tbl. 4.26.

Note: Because the combined market shares for fixed wireless and satellite services never exceed 1 percent, those access technologies are not included in Figure 9.

As Figure 9 shows, DSL has increased its market share from 11.4 percent in 1998 to 36 percent in 2002. Some competition in the broadband market has also come from fixed wireless and satellite providers, but the market share for such services remained at or below 1 percent from 1998 to 2002.

With a commanding lead in market share, cable modem providers create a competitive alternative to DSL providers. Hence, mandatory unbundling of ILECs to promote broadband access competition is difficult to justify. Platform competition among DSL and cable modem providers should constrain broadband Internet access prices in the absence of regulation.

3. Stepping Stone Hypothesis

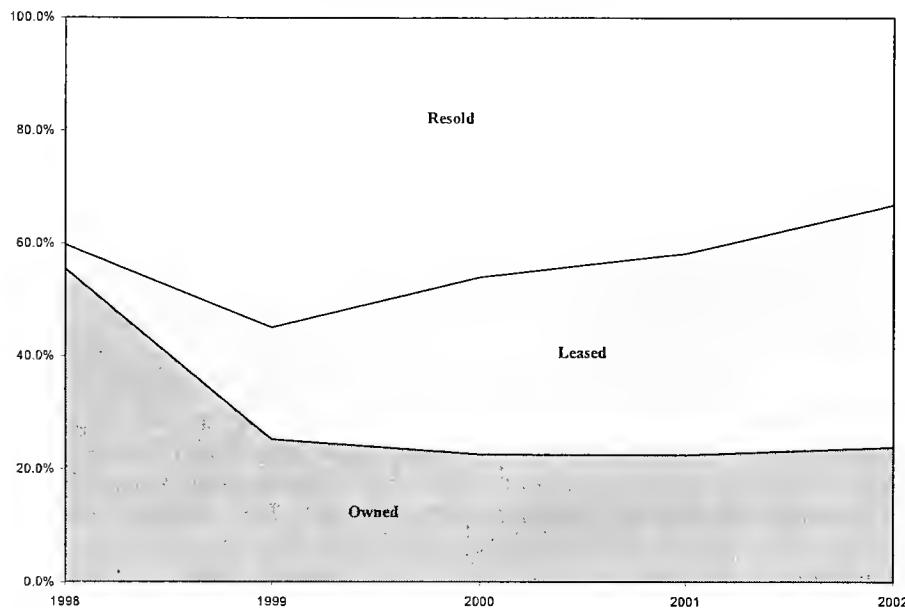
The implication of the stepping stone hypothesis is that CLECs will invest in their own networks after gaining market share by leasing ILECs' lines at regulated rates. The number of CLEC-owned access lines in Canada has increased from approximately 60,000 in 1998 to over 175,000 in 2002.²⁹⁹ By contrast, in the United States, the number of CLEC-owned access lines has remained constant at roughly 6 million since December 2001.³⁰⁰ Although the absolute number of facilities-based lines is rather small, the fact that facilities-based lines increased by 192 percent suggests that Canada's less expansive approach to mandatory unbundling did not completely discourage CLECs from investing in their own

299. See 2003 Report to the Governor, above n 253, at 46 fig. 4.21.

300. See FCC Local Competition Report 2003, above n 37, at 6 tbl. 3.

facilities. Figure 10 shows that the share of CLEC retail lines by technology from 1998 through 2002.

Figure 10: Share of CLEC Local Retail Lines by Technology, 1998-2002



Source: CRTC, *Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets*, Nov. 2003, at 46 fig. 4.21.

Figure 10, however, presents a different picture. Despite the increase in the absolute number of CLEC-owned access lines, Canadian CLECs became increasingly dependent on unbundled loops. From 1999 to 2002, the share of unbundled loops increased by roughly 23 percent and the share of resold lines decreased by roughly 22 percent. Because the share of CLEC-owned lines remained relatively constant from 1999 to 2002, most of the substitution is from resale to local loop unbundling. Hence, there is little economic support for the stepping stone hypothesis, which suggests that the share of leased lines should decrease over time.

4. Wholesale Competition

Mandatory unbundling was intended to stimulate the supply of loops and transport by facilities-based CLECs for new entrants.³⁰¹ The wholesale market in Canada grew by 79.6 percent from 1998 to 2002, although wholesale local lines accounted for only 2.5 percent of total local lines by 2002.³⁰² Within the small wholesale market, CLECs have captured an increasing share since 1998.

301. See CRTC Decision 97-8, above n 257, at ¶ ____.

302. Ibid, at 38 tbl. 4.9, 47 tbl. 4.20

Table 5: Wholesale Local Lines in Canada (Thousands)

	1998	1999	2000	2001	2002
ILECs	280	306	289	368	419
(share)	96.6%	87.4%	75.9%	77.6%	80.4%
CLECs	10	44	92	106	102
(share)	3.4%	12.6%	24.1%	22.4%	19.6%

Source: CRTC, *Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets*, Nov. 2003, at 47 (tbl. 4.20).

As Table 5 shows, CLECs' share of the wholesale market increased from less than 3.5 percent of lines in 1998 to close to 20 percent in 2002. Despite the increasing CLEC share, the small size of the wholesale market suggests that mandatory unbundling has not stimulated the supply of loops by competitive carriers.

5. Other Observations about the Process

Like the United States, Canada does not have a single incumbent that provides local service on a nationwide basis. Instead, a number of ILECs provide provincial service. Following deregulation, ILECs were no longer provincially confined, so they began to compete with other ILECs outside their incumbent region. Similar to CLECs, out-of-territory ILECs demonstrated a heavy dependence on the local ILEC's lines.

Table 6: Market Share of Local Lines of Out-of-Territory ILECs, 2002

Province	City	Business Lines	Residential Lines	Total Lines
British Columbia	Vancouver	1.9%	0.0%	0.8%
	Victoria	1.4%	0.0%	0.4%
Alberta	Calgary	0.9%	0.0%	0.4%
	Edmonton	3.0%	0.0%	1.1%
Ontario	Hamilton	0.5%	0.0%	0.1%
	Kitchener	0.2%	0.0%	0.0%
	Toronto	1.9%	0.0%	0.9%
Québec	Montréal	2.7%	0.0%	0.8%
	Québec	4.2%	0.0%	1.3%

Source: CRTC, *Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets*, Nov. 2003, at 42 (tbl. 4.13).

As Table 6 shows, out-of-territory ILECs largely compete in urban business segments and account for only a small percentage of the total lines even in large cities. ILECs involved in out-of-territory activities include Bell Canada and MTS through Bell West, TELUS, and SaskTel through Navigata.³⁰³

There is some evidence that ILECs are investing in their own networks outside of their incumbent regions. Since 1999, TELUS has built and acquired its own national fiber-optic network, which has facilitated its entry into western and central Canada.³⁰⁴ By the end of 2004, Bell West plans to invest over \$102 million in a

303. Ibid, at Appendix 4, 1

304. See TELUS Annual Report, above n 283, at 39.

network connecting over 80 percent of Alberta's population.³⁰⁵ In 2003, Navigata received two contracts from Industry Canada that will expand its existing infrastructure in British Columbia.³⁰⁶

To the extent that out-of-territory ILECs can transition from unbundled loops to facilities-based competition, mandatory unbundling might fulfil one of its objectives. If, however, out-of-territory ILECs are discouraged from investing in their own facilities, then mandatory unbundling is likely harming the competitive process. Regardless of the precise form that competition among ILECs takes, the fact that it occurs is a significant market development.

E. Germany

Germany's Telecommunications Act of 1996 requires that a 'dominant' operator allow a new entrant to interconnect to its network.³⁰⁷ The Act's intentions were outlined in sections 1 and 2. One goal of the Act was 'to promote competition, to guarantee appropriate and adequate services throughout the country and to provide for frequency regulation.'³⁰⁸ A second goal was 'to ensure equal-opportunity and workable competition, in rural as well as urban areas, in telecommunications markets.'³⁰⁹

Under Germany's 1996 Act, the Regulator of Telecommunications and Post (RegTP) was given the authority to regulate and monitor the German telecommunications industry. Through mandatory unbundling in Germany, regulators correctly did not attempt to achieve marginal-cost-based pricing,³¹⁰ as the high fixed costs and common costs of telecommunications networks preclude such an outcome. In particular, German regulators envisioned a telecommunications industry in which each supplier in the market strategically considers the existence and reaction of its competitors when making its own decisions.³¹¹ Furthermore, regulators recognized that barriers to entry into the telecommunications industry would decline over time.³¹²

305. Bell West, About SuperNet (<http://www.bellwest.ca/supernet.html>).

306. See SaskTel Annual Report, above n 286, at 36. As of May 2004, Navigata owned 2,500 km of network in British Columbia. See Navigata, About Us, Our Network (<http://www.navigata.ca/en/about-us/our-network/>).

307. Federal Ministry of Posts and Telecommunications, Telecommunications Act at §33-35 (Oct. 1996) (available at www.bfd.bund.de/information/tkgeng.pdf) [hereinafter *German Telecommunications Act*].

308. Ibid, at § 1

309. Ibid, at § 2 ¶ 2

310. See, e.g., Christopher Engel, *The Path to Competition for Telecommunications in Germany, in Competition and Regulation in Telecommunication: Examining Germany and America* (J. Gregory Sidak, Christopher Engel, & Gunter Knieps ed., Boston: Kluwer Academic Publishers 2001) 17 [hereinafter, *Engel Path to Competition*].

311. Ibid, at 17 For example, the Telecommunications Act states that telecommunications regulators shall report every two years to the 'Monopolies Commission on the question as to whether there is workable competition in the telecommunications markets.' See German Telecommunications Act, above n 307, at §81. Therefore, *workable*, and not necessarily *perfect*, competition was considered acceptable.

312. See, e.g., *Engel Path to Competition*, above n 310, at 17. Engel states that the German Act's reference to workable competition is evidence that German regulators considered the possibility that multiple telecommunications services, such as fixed-line and mobile, would compete in the same market. Thus, barriers to entry would be reduced. Ibid For a discussion of the potential integration between fixed and mobile telephone and data services in Germany, see, e.g., Hasan Alkas,

1. Retail Competition

a. Pricing

Since mandatory unbundling was implemented in Germany, prices for fixed-line telecommunications services have declined substantially. Since January 1999, prices for fixed-line telecommunication service in Germany have declined by roughly 15 percent.³¹³ Prices for all Internet services, including dial-up Internet access, declined by 35 percent from 2000 through 2004.³¹⁴ It is possible, however, that external forces, such as competition from mobile telephony, were already causing fixed-line telephone prices to fall, and that mandatory unbundling did not alter that trajectory. Proponents of mandatory unbundling might attribute the decline in prices that preceded the change in the regulation (from 1998 through 1999) to the mere threat of mandatory unbundling.

b. Investment

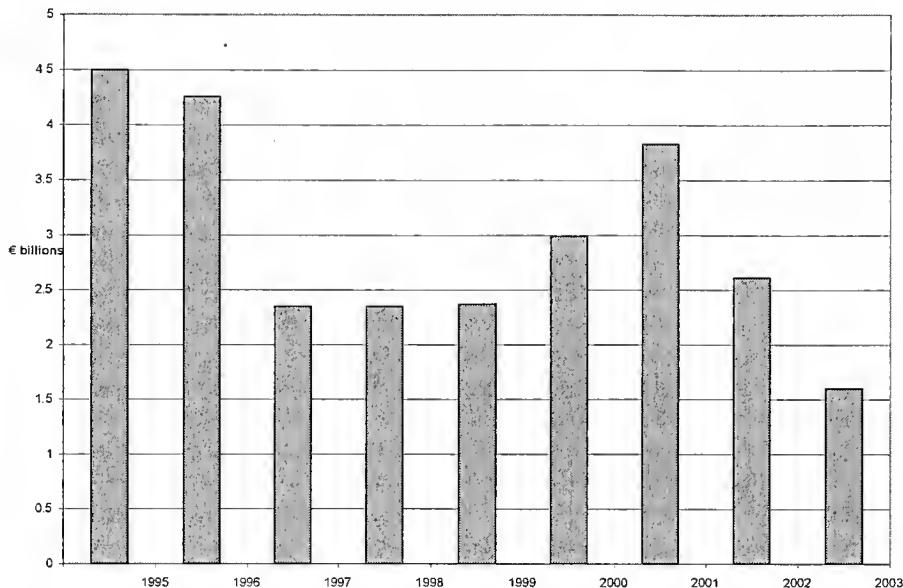
To the extent that mandatory unbundling threatens the incumbent operator's profits in the current generation services, the regulation might encourage the incumbent to invest in new capabilities that are not subject to unbundling. Figure 11 below lists yearly investment in fixed network assets by Deutsche Telekom (DT), the incumbent operator in Germany, from 1995 to 2003.

Entwicklungen und regulierungspolitische Auswirkungen der Fix-Mobil Integration, Dec. 2002 (available for purchase at: http://www.wik.org/content_e/diskus/210.htm).

313. Federal Statistics Office, Price Index for Telecommunications Services (available at <http://www.destatis.de/indicators/e/tpi101ae.htm>).

314. Ibid

Figure 11: DT Fixed Network Asset Investment: 1995-2003



Source: Deutsche Telekom, Deutsche Telekom AG 2003 SEC Form 20-F, at 138, 30 March 30 2004; Deutsche Telekom, Deutsche Telekom AG 2000 SEC Form 20-F, at 71, 4 May 2001; Deutsche Telekom, Deutsche Telekom AG 1998 SEC Form 20-F, at 68, 15 April 1999. Data for 1995, 1996, and 1997 are reported in DM in DT's financial statements. To convert these figures into €, we divided by the final conversion rate of DM into € of 1.95583. See, e.g., Wincor-Nixdorf, Euro Conversion: Logistic Challenge (available at http://www.wincor-nixdorf.com/static/onlinereport_eng/report01_08/retail/perspektive/euro.html).

The data in Figure 11 indicate that in 1995 and 1996, the years before and during Germany's decision to require unbundling, DT invested over €4 billion annually in its fixed telecommunications network. In 1997, the year after Germany's 1996 Act, DT's investment in its fixed network fell from €4.26 billion to €2.35 billion. Annual investment in DT's fixed network remained below €3 billion until 2001, the height of the industry's growth, when it increased to €3.83 billion. Investment subsequently fell to €2.61 billion in 2002 and €1.6 billion in 2003. Because DT's investment in its fixed network assets was largest in the years just before and during Germany's decision to unbundle, it is difficult to accept the hypothesis that mandatory unbundling stimulated incumbent investment activity.

2. Entry Barriers

The existence of platform competition for voice and data services independent of mandatory unbundling calls into question the need for government intervention. Unfortunately, platform competition has yet to significantly materialize in Germany, for reasons that we address in a later section. DSL subscribers through both DT and unbundled access providers increased by over 450 percent from the end of 2000 through the end of 2002. However, cable modem service has not yet been widely deployed in Germany. In December 2003, RegTP reported that DT

served 4.1 million DSL customers.³¹⁵ Despite the fact that 86 percent of German homes were passed for cable at that time,³¹⁶ there were only 60,000 cable modem subscribers.³¹⁷ As of December 2003, DT accounted for nearly 89 percent of the broadband market.³¹⁸ In February 2004, RegTP announced that cable modem service was beginning to provide broadband competition to DSL:

[T]here are the first significant indications that the cable connections are being retrofitted for broadband access services. Intermodal competition in broadband is now finally getting underway, as evidenced by 60,000 bidirectional cable and 45,000 satellite delivered Internet connections.³¹⁹

A likely reason for the low market share of cable modems is the fact that DT owned the cable network in Germany until 2000.³²⁰ DT, on its own accord, divested its cable network assets between 2000 and 2003,³²¹ but by that time DT had extensively upgraded its copper network for DSL service. Moreover, because of the shorter loop lengths in Germany, DSL is technologically superior for a wider group of customers compared to the United States. Hence, DSL service had a significant head start over cable modem service in the broadband market.

Now that DT has divested its cable assets, cable companies in Germany are starting to offer voice and data services to compete with DT. One German telecommunications analyst, DrKW Research, expects 'cable operators to begin marketing broadband more successfully going forward.'³²² For example, cable operator Mobilcom, which began by offering cable modem services over its fixed line network, introduced cable telephony in 2002.³²³ In 2003, Mobilcom received over €145³²⁴ million in revenues from fixed-line telephony service, and its broadband revenues exceeded €336 million.³²⁵ In September 2001, Callahan Associates, a European cable company, purchased the majority of DT's interests in Kabel Baden-Wuerttemberg (KabelBW).³²⁶ By the end of 2003, KabelBW had enlisted 750,000 households to its digital medial cable system, which is capable of providing telephony and broadband service.³²⁷ KabelBW also planned to expand its service by investing €20 million during 2004.³²⁸

In addition to cable operators, DT faces facilities-based competition from Arcor, a majority-owned subsidiary of Vodafone.³²⁹ With 2.6 million

315. RegTP, Annual Report 2003, at 20 (11 February 2004).

316. OECD, *The Development of Broadband Access in OECD Countries* 27 (29 October 2001).

317. RegTP, Annual Report 2003, at 20 (11 February 2004).

318. Ibid

319. RegTP, *Presenting the Annual Report 2003: German Broadband Market in Dynamic Change*, 11 February 2004.

320. RegTP, Annual Report 2003, at 22 (11 February 2004).

321. Ibid

322. DrKW Research, *ADSL—Light at the End of the Tunnel*, European Wireline, Sept. 2003.

323. Mobilcom, Annual Report 2003: Group Account of Mobilcom AG 28 (Dec. 2003).

324. Ibid, at 83

325. Ibid

326. Callahan Associates, Cable Partners in Germany (available at: <http://www.callahanassoc.com/businesses/kabelbw.html>).

327. KabelBW, *Multi-Media Cable Now Also in Ulm*, 11 March 2004 (available at: <http://translate.google.com/translate?hl=en&sl=de&u=http://www.kabelbw.de/&prev=/search%3Fq%3DKabelbw.de%2B%26hl%3Den%26lr%3D%26ie%3DUTF-8>).

328. Ibid

329. Vodafone, Vodafone Group PLC 2003 Annual Report 122 (2003).

subscribers,³³⁰ Arcor is one of the largest CLECs in Germany.³³¹ In December 2003, Arcor agreed to purchase telecommunications equipment and software from Lucent Technologies in an effort to provide DSL service for up to 150,000 customers.³³²

Although platform competition is not as robust in Germany as it is in other countries in our survey, the recent efforts of the independent cable companies suggests that entry barriers in the market for fixed-line voice or data services are surmountable. In particular, cable operators expect to earn revenues in excess of the common costs to upgrade the cable network. The fact that these efforts were not undertaken until 2002 does not support the hypothesis that local telephone networks lend themselves to natural monopoly.

3. Stepping Stone Hypothesis

As of December 2002, it was not apparent that entrants were converting from unbundled loops to facilities-based lines. The EC reported that new entrants offered broadband services primarily through cable modem or unbundled access of the local loop.³³³ Therefore, unless either certain cable modem suppliers had first entered the market through unbundled access (highly unlikely), or a facilities-based entrant that initially relied on unbundling had failed before December 2002 (slightly more likely), entrants were not migrating from unbundled access to facilities-based service for broadband.

Between 2001 and 2003, CLECs invested heavily in their own facilities. In the two-year span between 2001 and 2003, €18.5 billion was invested in Germany's telecommunications networks—€8.7 billion of which (47 percent) was spent by DT's competitors.³³⁴ In its 2002 review of the German telecommunications marketplace, RegTP stated that DT's competitors were supplying service in the Hamburg, Cologne, and Oldenburg through a combination of unbundled access and their own facilities.³³⁵ Hence, although there is some evidence that entrants use both UNE and facilities-based approaches in combination, there is little evidence that UNE-based CLECs have transitioned to facilities-based competitors.

4. Wholesale Competition

Finally, mandatory unbundling is generally intended to stimulate a competitive wholesale market, in which facilities-based CLECs supply other CLECs. By the beginning of 2004, the wholesale market had not developed in Germany. RegTP reported that only 10 percent of telecommunications revenues in 2003 were

330. Ibid

331. See, e.g., PriMetrica, *Global Comms Sample Country Profile: Germany Wireline* (2004) (available at: http://www.primetrica.com/products/global_comms/germany_profile/03_wireline.html) [hereinafter *PriMetrica Germany Profile*].

332. Lucent Technologies, *Arcor and Lucent Technologies Extend Contract for Broadband Access Technologies*, 10 December 2003 (available at: <http://www.lucent.com/press/1203/031210.nsa.html>).

333. See Commission of the European Communities, Eighth Report from the Commission on the Implementation of the Telecommunications Regulatory Package: European Telecoms Regulation and Markets 2002, at 30 (3 December 2002) [hereinafter *European Communities Eighth Report*].

334. RegTP Press Release, *Great improvement in competitors' position in the telecoms market Less dependence on Deutsche Telekom AG Yet competition in the telecoms and postal service markets not self-sustaining*, 11 December 2003.

335. RegTP, Annual Report 2002, at 18 (5 February 2003).

associated with interconnection.³³⁶ RegTP attributes the majority of wholesale supply to DT.³³⁷ At least one CLEC provides wholesale services in Germany. In March 2002, debitel, a German CLEC, entered into an arrangement with Arcor in which debitel would provide broadband services to its customers using Arcor's facilities.³³⁸

5. Other Observations About the Process

The telecommunications industry in Germany was unique in that the incumbent telecommunications operator owned a significant portion of the cable television assets. Elsewhere in Europe and in the United States, cable companies have proven to be significant facilities-based competitors to the incumbent fixed-line operator. By the time it had divested the majority of its cable assets, DT held a significant advantage in both voice and data services.

Proponents of mandatory unbundling might be quick to point to an apparent 'market failure' in Germany that justifies regulatory intervention in the form of mandatory unbundling. But the only failure in Germany was the flawed market structure that evolved during the public ownership of DT, which allowed a single firm to own both the cable and copper networks. Clearly, Germany was a special case, and lessons about the desirability of mandatory unbundling elsewhere cannot be inferred from Germany.

F. Summary

The above analysis can be summarized according to key metrics that inform the rationales for mandatory unbundling. In Table 7, we provide those summary statistics by country.

336. RegTP, Annual Report 2003, at 14 (11 February 2004).

337. RegTP, Annual Report 2002, at 18, 73, 78-79 (5 February 2003).

338. *PriMetrica Germany Profile*, above n 331.

Table 7: Summary Statistics That Inform the Rationales for Mandatory Unbundling, by Country

Country	Rationale 1: Retail Competition	Rationale 2: Entry Barriers	Rationale 3: Stepping Stone Hypothesis	Rationale 4: Wholesale Competition
United States	Slight increase in prices of local voice services; ILEC capital expenditure decreases	Cable share of residential broadband: 66% (June 2003). Cable share of switched access lines: 2% (June 2003)	No evidence in support	Competitive provision of DS-3, transport, and switching for enterprise customers
United Kingdom	No measurable decline in prices of telecommunication services; CLEC DSL share almost 50%; broadband prices have decreased; ILEC capital expenditure decreases	Cable share of broadband: 41% (July 2003). Cable share of residential lines 19% (March 2002)	No evidence in support	Competitive backbone fiber and metropolitan access network services; 51% of wholesale revenues are controlled by entrants
New Zealand	Prices for telephone call charges have remained flat; telephone and rental connection charges have increased slowly; ILEC capital expenditure decreases between 2001 and 2003	Facilities-based CLEC share of voice: 7% (June 2002) Facilities-based share of residential broadband: 28+% (June 2003)	No evidence in support	No evidence of facilities-based competitors
Canada	Prices for telephone services have increased faster than inflation; ILEC capital expenditures increased through 2001, then decreased; CLEC capital expenditures per revenue dollar decreased after 1999	Cable share of residential broadband: 64% (2002) CLEC share of local lines: 4.8% (2002)	No evidence in support	CLEC share of wholesale lines is 20% (2002), but total wholesale lines constitute only a 2.5% share of total lines
Germany	Mild decrease in prices for fixed line telephone services; Significant decrease in prices for Internet access; ILEC capital expenditures decreased	Cable & powerline telecommunications (PLT) share of broadband: 1.5% (Dec. 2003) CLEC share of local lines: 3.5% (Dec. 2003)	No evidence in support	Wholesale market has not developed

Sources: *FCC Local Competition Report 2003*, at 2; *FCC High-Speed Services*, at tbl. 3; *CRTC, Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets*, Nov. 2003, at 41, 57 (tbl 4.26); *REGTP, Annual Report 2003*, at 19, 20 (11 February 2004).

As Table 7 shows, with a few possible exceptions, the rationales for mandatory unbundling do not appear to be substantiated in practice. The clearest example is the stepping stone hypothesis, which fails to be substantiated in any country in our survey. The entry barriers hypothesis, which implies that mandatory unbundling is necessary to overcome entry barriers in local communications, is rejected. In each country in our survey, the existence of facilities-based competition between cable providers and ILECs proves that the barriers to entry in local communications, to the extent they exist, are not insurmountable. Finally, competition from CLECs generally does not appear to lower retail prices, with the possible exception of the decline in Internet access prices in Germany following the imposition of mandatory unbundling.

The summary statistics provided in Table 7 are not the same as summary statistics of the effects of mandatory unbundling on market shares in voice telephony and in broadband. Table 8 provides CLEC market shares of DSL lines and voice lines by country.

Table 8: Summary Statistics of Structural Effects
of Mandatory Unbundling, by Country

Country	CLEC Share of DSL Lines	CLEC Share of Voice Lines
United States	5.4% (June 2003)	14.7% (June 2003)
United Kingdom	48.8% (July 2003)	17.0% (Dec. 2003)
New Zealand	28% (June 2003)	7% (June 2002)
Canada	9% (2002)	4.8% (2002)
Germany	11% (Dec. 2003)	3.5% (Dec. 2003)

Sources: EU Ninth Report at 59; Ofcom FTMI Update at tbl. 2; CRTC, *Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets*, Nov. 2003, at 41, 57 (tbl 4.26); RegTP, Annual Report 2002, at 19, 20 (5 February 2003).

As Table 8 shows, CLECs have acquired significant market shares in the United Kingdom (48.8 percent of DSL lines) and in the United States (17.0 percent of voice lines). It bears emphasis, however, that a high market share for CLECs does not justify mandatory unbundling on an *ex post* basis. Similarly, a high market share for ILECs does not imply that mandatory unbundling was justified.

IV. Lessons Learned from the Unbundling Experience

There are two possible explanations for why a rationale for mandatory unbundling at TELRIC was not substantiated in practice. First, the rationale was never supported in theory. Second, the rationale was supported in theory but those theories could not be transported from textbook into practice. For example, an exogenous shock, unforeseen by the regulators, may have occurred and the regulatory framework was not sufficiently flexible or robust to cope adequately with it. Much analysis has been devoted to the first explanation.

For the second category of rationales, we identify several factors that might prevent a regulator from achieving the goals of mandatory unbundling at TELRIC. These factors highlight the importance of robust regulation—namely, regulation that can accommodate an exogenous change to the system or a range of possible reactions by the regulated firm. To the extent that mandatory unbundling regimes are not designed with this property in mind, they are more likely to fail in practice.

A. The Rationales That Were Not Correct in Theory

Some of the rationales for mandatory unbundling were not supported in economic theory, which implies it was extremely unlikely for regulatory intervention—no matter how perfectly executed—to serve its purpose. The first rationale that fails in theory is the contention that competition in retail markets cannot be achieved without mandatory unbundling. This rationale cannot account for the significant facilities-based competition that has emerged independent of mandatory unbundling. For example, cable television providers did not avail themselves of access obligations yet have positioned themselves to make significant inroads in residential voice markets and have seized two-thirds of the market for high-speed

data in the United States. Wireless networks have displaced significant minutes of long distance service that previously traveled across fixed networks and have displaced some primary and secondary fixed lines altogether for a growing number of voice customers. In enterprise markets, facilities-based CLECs have successfully replicated the incumbent's fixed network and can therefore provide competitive voice and data packages for large businesses. Even if such facilities-based competition never materialized, regulators could have pursued alternative policies to reduce retail prices. For example, price controls are a direct, albeit inefficient, means to force prices toward marginal costs. Hence, mandatory unbundling was not solely responsible for the facilities-based competition that emerged in voice and data services.

The second rationale that fails in theory is the idea that mandatory unbundling would stimulate competition in the wholesale market for network elements. If wholesale supply of network elements were a viable business strategy, then one would expect several firms to pursue and succeed at such a strategy. But the experience in the United States and elsewhere suggests that the most valuable 'component' of the network is the carrier's relationship with the customer. It therefore makes little sense to cede this valuable asset to an intermediary for the sake of avoiding the retail costs of providing the service to the end user. Moreover, the idea of divorcing the wholesale activities from the retail activities ignores the significant economies of scope that can be realized in their joint production. For these reasons, it was not reasonable for regulators to expect that mandatory unbundling would induce a host of new carriers to enter and limit their business plans to wholesale activities only.

B. The Rationales That Were Correct in Theory Yet Were Not Satisfied in Practice

The remaining rationales—namely, lower retail prices and the stepping stone hypothesis—are theoretically plausible yet were likely upset by factors not anticipated by regulators. Neither of these rationales can be ruled out on the basis of theory alone. Aside from high-end loops for enterprise customers and transport for all customers, there is little evidence of CLEC investment in their own facilities in fixed markets. CLECs generally appear to remain dependent upon unbundled elements and have made little attempt to substitute those assets with their own facilities. Instead, access seekers appear to have chased retail margins, as evidenced by the dramatic shift from resale to UNE-P in the United States, and to have regarded the various access inputs as substitutes in this process. The announced exits of AT&T and MCI from residential local access markets in the United States in 2004 further supports this conclusion.

There are two hypotheses that might explain the failure of the stepping stone hypothesis in practice. First, regulators have been remarkably unconditional in developing access regulations that would support the transition to facilities-based competition. In particular, regulators have failed to impose obligations to ensure that promises to evolve from UNE-based to facilities-based competitor are subsequently realized. For example, regulators could allow the prices for fixed unbundled elements to increase over time to ensure that access seekers have incentives to invest in their own facilities. Second, mandatory unbundling may have attracted 'fly-by-night' firms that were primarily interested in short-term margins and eschewed long-term development of a rival network. Both cases are

prime examples where economic theory cannot be readily transported from the textbook to the real world. Also, regulators failed to make and keep a 'credible commitment' to sunset mandatory unbundling, as in Canada, which provided incentives for CLEC strategic behavior to receive subsidized unbundled elements.

With respect to lower retail prices as a rationale, it is true that even artificial entry results in lower retail prices under most oligopoly models with homogenous products. Prices may not decline, however, if entrants differentiate their offerings with unique features or if the cost of entry prevents entrants from under-pricing the incumbent. The first explanation for why retail prices did not decline after the introduction of mandatory unbundling does not appear to be satisfied. There is scant evidence that entrants engaged in innovating offerings. At most, entrants 'innovated' by bundling voice and data services under a single offering, which may have allowed entrants to charge a higher price relative to a stand-alone replica of the incumbent's offering.

If significant product differentiation is not observed, then perhaps retail prices did not decline because entrants could not afford to under-price the incumbent's offering. According to this hypothesis, entrants overpaid for ILEC customers and were therefore incapable of offering discounts to customers. Stated differently, the only 'innovation' offered by entrants came in the form of branding and distribution rather than improvements in networks and other infrastructure. From 2001 through 2003, the largest U.S. data CLECs reduced their customer acquisition costs significantly, but often by not enough to remain cash flow positive. With a discount rate of 7 percent and a terminal value of 50 percent of fifth-year cash flows, a typical data CLEC will break even by spending \$260 or less to acquire a customer if there is no churn. By this calculus, Covad's customer acquisition cost of \$563 in 2003 did not permit it to recover its investment.³³⁹ Indeed, AT&T's abrupt exit strategy in 2004 is consistent with spending heavily on advertising its brand name, and with the prospect of selling its business to an incumbent. Apparently, the market did not develop as regulators had hoped.

Conclusion

Telecommunications regulators offered four major rationales for mandatory unbundling: (1) competition in the form of lower prices and greater innovation in retail markets is desirable, (2) competition in retail markets cannot be achieved with mandatory unbundling, (3) mandatory unbundling enables future facilities-based investment ('stepping-stone' or 'ladder of investment' hypothesis), and (4) competition in wholesale access markets is desirable. An empirical review of the unbundling experience in United States, the United Kingdom, New Zealand, Canada, and Germany suggests that none of the four rationales is supported in practice. Rationales (2) and (4) were incorrect in theory and therefore had little or no chance of succeeding in practice. By contrast, the stepping stone hypothesis and lower retail prices were theoretically plausible under certain assumptions yet were not satisfied in practice. The stepping stone hypothesis may have failed due to selection bias created by the unbundling program—that is, the very firms that were attracted to compete with the aid of government support were not interested in

339. Covad Communications Group, Inc. 2003 S.E.C. form 10-K, filed 27 February 2004 (available at <http://www.sec.gov/Archives/edgar/data/1043769/000095013404002671/f96657e10vk.htm>);

developing long-term rival networks. Retail prices may not have declined as quickly as regulators had hoped due to the divergence of interests between managers and shareholders of telecommunications firms or because regulated telecommunications prices are not subject to market power by their incumbent providers in the first place.

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